

# THE IRON AGE

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## Wages for Ability, Output and Service

Human Factor Problem as Met at Bullard Plant,  
Bridgeport—Maxi-Pay Plan, Production Bonus,  
Bonus for Steady Employment and Group Insurance

BY W. E. FREELAND

Speaking of the greatest problem of business management, Gen. George W. Goethals said: "How many business men do you think ever made an inventory of their employees? Depreciation is of infinitely more importance in a study of payrolls than in a survey of machinery. And the mere experience of years may bring depreciation rather than appreciation. I frequently think that 'efficiency' is a much over-strained word—sounds like nuts and screws—obnoxious when hammered out to employees without the lubricant of recognition of individual effort."

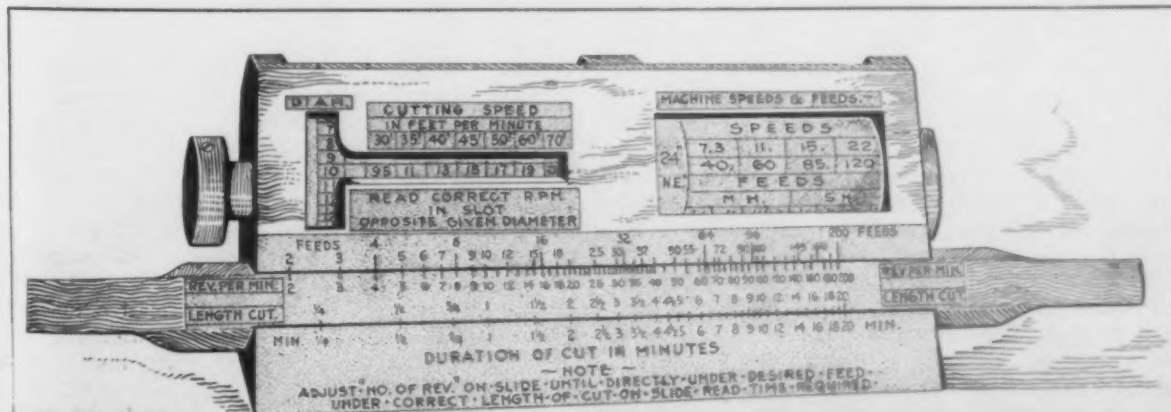
A happy phrase, that! "The lubricant of recognition of individual effort!" It was the working out of an endeavor to supply the lubricant that enabled the Bullard Machine Tool Co., Bridgeport, Conn., to increase its working force from 250 hands to over 1400 hands in a little more than a year in the face of the stiffest competition for labor that this country has ever known in the metal-working industries. And it was by refining the lubricant that a little later an efficiency was gained by which the production records of the group of 1400 men were excelled by a working staff of a little over 1100.

Hourly rates alone are not the determining factor of labor costs. Labor cost is the lowest when help is steady. Three things inevitably follow low labor turnover: increased output, decreased spoilage of work and decreased spoilage of tools. In these terse sentences are expressed the fundamental beliefs upon which the Bullard management builded; they form the keystone of the success of the organization. Most managers will concede that the best work and the most work is produced by the highest-

priced man and that the short-time man causes a direct loss. The problem then comes down to the best method of bidding for intelligence, skill and continued service.

The Bullard Company employs four methods to secure and retain the most profitable type of workmen. It has in operation a "Maxi-Pay" wage plan, a production bonus, a service bonus and an attractive form of insurance. From time to time happily worded pieces of literature are distributed to the workmen to call attention to some phase of co-operation.

The "Maxi-Pay" plan offers full opportunity for advancement along definite lines to those showing ability, provides a wage-rate limited only by ability and occupation, and advances wages in recognition of ability. The workmen are divided into these classes: Class AA includes sub-foremen and leaders in charge of working gangs of mechanics and, so far as possible, all foremen and shop executives are selected from this class. The minimum rate per hour is 55 cents but the maximum rate is dependent on ability. Class A includes skilled mechanics of demonstrated ability with a minimum rate of 50 cents per hour and the possibility of a higher maximum rate. Class B includes mechanics of good average ability and the rate is 45 cents per hour. Mechanics of limited experience are placed in Class C. The rate per hour for this class is 40 cents. Apprentices, both special and regular, are included in class D. Men from this class, upon completing their courses, are advanced to the class determined by computing their average efficiency records over the last three months of their apprenticeship. In class E is found labor of all kinds,



skilled or unskilled, which is not directly productive. The minimum rate per hour is 30 cents, but the maximum is dependent upon ability and occupation. In the employment of men of this class, preference is given to those who speak and write English and who show qualities which will later warrant advancement. This "maxi-pay" plan has been in successful operation since May 15, 1916.

On Nov. 1, 1916, a production bonus was incorporated into the plans. Standard times are set for each operation in a manner to be described later in this article. These standard times remain unchanged for one year from date, provided no change is made in designs of piece, material, number of

of productive employees the basis is set at 75 per cent and one per cent of wages is paid for each per cent of efficiency above 75 per cent. Records are kept of the standard time on each job and the operator's actual time and the man's efficiency is determined by monthly computations. The records of bonuses earned are used as a basis for advancement from one class to another in the "maxi-pay" rating.

A premium is also paid for prompt, regular and continued service. An employee gets a bonus amounting to 10 per cent of the weekly wages he earns during the regular hours of operation. No bonus is paid on overtime. A service premium

Fig. 1. 2 and 2A show a so-called contract card, which is made out in duplicate. A yellow form goes to the operator as a guarantee of contract price and notification of standard time on the job. After being turned in by the operator, it is sent to the cost department and then to the planning department. The white duplicate form goes directly to the cost department. The time on the back of the yellow form is filled in by the time clerk and that of the white form by the cost department, and the two are checked to insure accuracy. The yellow contract forms are returned to the planning department, they are inserted in the envelope, Fig. 3. In the course of time these envelopes contain a large amount of data upon any specific operation.

When the standard time is determined, a card, Fig. 4, is filled out by the planning department and sent to the proper time clerk who retains it in a permanent file.

The form, Figs. 5 and 6, is made out after each job, different colors being used for bonus work and non-productive day work. They are kept in a special envelope, Fig. 7.

If any operator considers that the standard times are too low, he is given an opportunity to fill out the form Fig. 8 with such general statements of conditions and remedies as he can make.

pieces, method or equipment. Care is taken to see that such changes, if made, are equitable both to the operator and to the company. Usually the standard time as first figured by the planning department is considered only as trial time on new work, or on old work done in new ways or with different equipment. Trial times are considered as standard times in bonus calculations and payments until sufficient experience is gained to demonstrate their correctness or to make adequate changes. When once established as standard time, there is rarely occasion to make a change for at least a year. The basis of efficiency varies according to the class rating of the operator. In the lowest class

voucher (Fig. 10) is inclosed in the pay envelope on each pay day. It will be seen that this voucher is in three portions, the middle one being a receipt form which must be signed by the person to whom it is made out. These premium vouchers become payable four weeks after date of issue, if the person receiving the voucher is still in the service of the company. They become void if the employee leaves the company, either voluntarily or by discharge for cause. They are not negotiable and cannot be transferred. The premium system for continued service has been effective since Nov. 1, 1915, and has worked out well.

On Nov. 14, 1916, the company took out group

[illegible]

In gathering together the machine time figures for an entire machine or an assembly, Fig. 9 is in use. The same form is also employed in making up estimates for machining of any piece submitted by a customer.

The premium voucher, Fig. 10, is made up each week for every operator who has performed full 48 hours' service in the regular working hours. The premium is not payable until four weeks after issue.

insurance for all workmen who had been six months or more in the employ of the company. To an employee of six months' standing, an insurance certificate for \$500 is given. After completing a year of continuous employment, the value of the certificate is increased to \$600. For each year of continuous employment thereafter \$100 is added to the value of the certificate until a maximum of \$1,500 has been reached. To all employees who had been ten years or more with the company a maximum value certificate of \$1,500 was given at the time the plan was put into operation. An employee not over 59 years old who becomes totally disabled by accident or disease while in the employment of the company has the amount of insurance which he has obtained distributed to him in equal amounts for such period of years as may be determined by the company after a conference with him and his beneficiary. It has been found that this particular form of group insurance has been especially attractive to the workmen.

One of the most interesting things in this entire system is the manner in which standard times are set without the use of time studies or, in most cases, without direct observation of the operation. It has not been

Name of Piece \_\_\_\_\_ Piece No. \_\_\_\_\_  
 No. for one Mach. \_\_\_\_\_ Mat & Size \_\_\_\_\_ Draw No. \_\_\_\_\_  
 Division \_\_\_\_\_ Used on \_\_\_\_\_  
 Dept. \_\_\_\_\_ Oper. \_\_\_\_\_ Unit \_\_\_\_\_ Shift \_\_\_\_\_  
 (11)

PREV. & NO'S DTY. \_\_\_\_\_  
 DATE \_\_\_\_\_  
 (12)

PRODUCTION BONUS (16)

UNDER THE  
**BULLARD**  
 MAXI-PAY  
 WAGE PLAN (14)  
 You Are Rated Class \_\_\_\_\_  
 Hourly Rate \_\_\_\_\_ Cents  
 First Pay \_\_\_\_\_

DEPT. NO. \_\_\_\_\_ DATE \_\_\_\_\_  
**Foreman's NOTICE OF EMPLOYEE'S Leaving**  
 NAME \_\_\_\_\_ NO. \_\_\_\_\_  
 TIME CEASES AT \_\_\_\_\_ A.M. \_\_\_\_\_ P.M. \_\_\_\_\_ DATE \_\_\_\_\_  
 DISCHARGED \_\_\_\_\_  
 LOST SITE \_\_\_\_\_  
 QUITS \_\_\_\_\_  
 REMARKS \_\_\_\_\_  
 FOREMAN (13)

WEEK ENDING \_\_\_\_\_  
 (15)  
**BONUS**  
 FOR  
 PROMPT, REGULAR AND  
 CONTINUED SERVICE

PRODUCTION BONUS RECEIPT  
 For Period Ending \_\_\_\_\_  
 I hereby acknowledge receipt of Production Bonus for the above period.  
 Sign here \_\_\_\_\_  
 PRODUCTION BONUS  
 For Period Ending \_\_\_\_\_  
 Your efficiency on completed contracts for the above period is \_\_\_\_\_ % which entitles you to \_\_\_\_\_ % on your wages as applied on the completed contracts or a bonus of \_\_\_\_\_  
 12.50 (17)

The planning department maintains a card system, Fig. 11, whereby the routing and standard time for all operations are kept in a permanent file.

Fig. 12. the form of card on which is kept the efficiency record of each employee.

Fig. 13 is a card employed to notify the office when a workman leaves or is discharged. Retaining these cards gives a concise analysis of the capacity and conduct of the men.

Notification of class rating or later notification of change in class rating are put upon a card, Fig. 14, enclosed in the pay envelope.

The continued service bonus is given to the workman in a small separate envelope, Fig. 15.

Production bonus is paid in a separate outlook envelope, Fig. 16.

The upper portion of the production bonus, Fig. 17, is a receipt form, the middle portion, a notification to workman, and small lower portion simply bears the total amount paid.



claimed for this method that it has the absolute accuracy of standards determined by time studies and no particular claim is made that the standard times are the quickest times in which the operation can be performed. The standard times are determined largely from two sources—one, the use of slide rules, which give the machine time for the operations; the other, from long-maintained records from which can be computed the average time in which the operation has been performed by the most competent men in the varying conditions found in any series of machining operations. In a word, the standards are not derived from men who have been taught to be purely mechanical in their motions, but come from the best efforts of intelligent operators from whom the fear of a cut in rates due to high wages has been removed.

Every effort is made to have a standard time absolutely fair time for the average skilled workmen. In the use of slide rules the planning department has become peculiarly proficient. Where standard slide rules for various kinds of machining operations are not available, they have devised slide rules to fit their needs. One of the interesting things seen here is the "prayer-wheel," which will give an answer to almost any question that can be asked regarding times and speed on boring mill work.

For certain kinds of work, Mr. Dwyer, chief of the planning department, has evolved a slide rule of the usual type with scales for the time, length of cut, feet per minute and feed, which is highly successful. The factor which makes it successful is that on this slide are certain figures which represent the results of much research work. For instance, on this slide one finds on one of the scales a mark which is the factor of internal grinding. Other factors which have worked out well furnish a quick reading on special subjects, such as spline milling, cylindrical grinding and cutting off stock with a power hack-saw.

To many it will probably seem incredible that such factors can be determined with sufficient accuracy to furnish reliable standards. The only answer to this is that from this slide rule a job of internal grinding, taking nearly 15 min., has been determined in advance within a few seconds of the average time of a skilled operator on hundreds of pieces. It is the practice of the planning department to determine from the original drawings trial times, which in most cases soon become standard times, on every operation on a new design of machine tool. This advance study of machining times has very valuable effects.

Every original drawing from the drafting department on new work is submitted to the planning department for study before any blue prints or photostat copies are made. The planning department may have something to suggest about new methods of machining, a change in the order of operations, or the use of special jigs or fixtures which will save in the handling of or add to the accuracy of the work. As the heads of the planning department are men of long years of experience directly in the shops, this collaboration on design work is a powerful factor toward the eradication of ill-designed pieces with the usual entail of costly machining operations.

As soon as the drawing of the piece has been finally settled upon, the planning department makes out a time-routing card (Fig. 11) which forms a permanent record of the sequence of operations on the piece. The time determined upon by the study of the drawing is entered upon a blue card (Fig. 4) which is called a despatch card and is filled by

the time clerks in the various departments as the standard time record for a specific operation. The time clerk makes out for each job a contract card (Fig. 1) which is made in manifold, the original on yellow paper going to the operator as a notice of standard time for the operation of the job. A duplicate on white cardboard is sent directly to the cost department. If the time clerk finds he has no despatch card for this operation, he refers the whole matter to the planning department which sets a trial time. The yellow card which goes to the operator is held until the job is done and is then approved by the foreman and inspector and sent to the cost department where the bonus is figured. It is then sent to the permanent file in the planning department. When it reaches the planning department it is placed in a contract envelope (Fig. 3) which contains a yellow card for each time that this operation has been performed previously.

Each employee, when entering the shop, is given a time-card envelope (Fig. 5). A time ticket for each job in process is made out daily by the time clerk. A blue card is made out for work on which a bonus will be computed and a red one for work on which there is no bonus. The job time tickets are kept in the time-card envelope and sent, at the end of the day, to the cost department.

A form is provided by which the operator can make a claim of too low time on a standard. These claims are given thorough consideration and if the claim is justified, the contract is changed. Fig. 9 shows the form which is sometimes used in the planning department when it is desired to obtain the cost of all the actual machine hours on a complete new design. This same form is used in computing estimates on work submitted by customers.

The amount of thought which has been put into handling this entire system, particularly where it comes directly in contact with the workmen, is evident in the way in which the various bonuses are made plain and kept clear by the variations in forms employed and by the use of special envelopes. This is particularly noticeable in the little envelope (Fig. 16) in which production bonus notices are placed.

One could not safely say that the success of this particular system of remuneration was due wholly to the system itself. Back of it lies a wise selection of administrators and underlying it a spirit which finds expression in many ways in their contact with the employees. Differences do arise from time to time, but the employees have been made to understand that as individuals they always have access to higher officials and that any complaint of injustice or unfairness will receive immediate attention and that the cause for complaint will be promptly removed if the facts justify it. That a sense of abiding loyalty has grown up as a result of the efforts of the past year to bridge the gap between employer and employee and to enlist the sincere interest of the employees in the concern's welfare is shown by the ever-flattening curve of labor turnover on the graphic chart of labor conditions.

On Tuesday, June 19, the Carnegie Steel Company, Pittsburgh, had 50 blast furnaces in operation and nine idle. The idle stacks include Zanesville, one Bellaire, Neville Island, two Edgar Thomson, and one Isabella, some of which are banked, awaiting coke. Edith, one Clairton, and Steubenville stacks are idle for relining and repairs, and will be started as soon as ready, if coke can be secured.



### Business in War Times

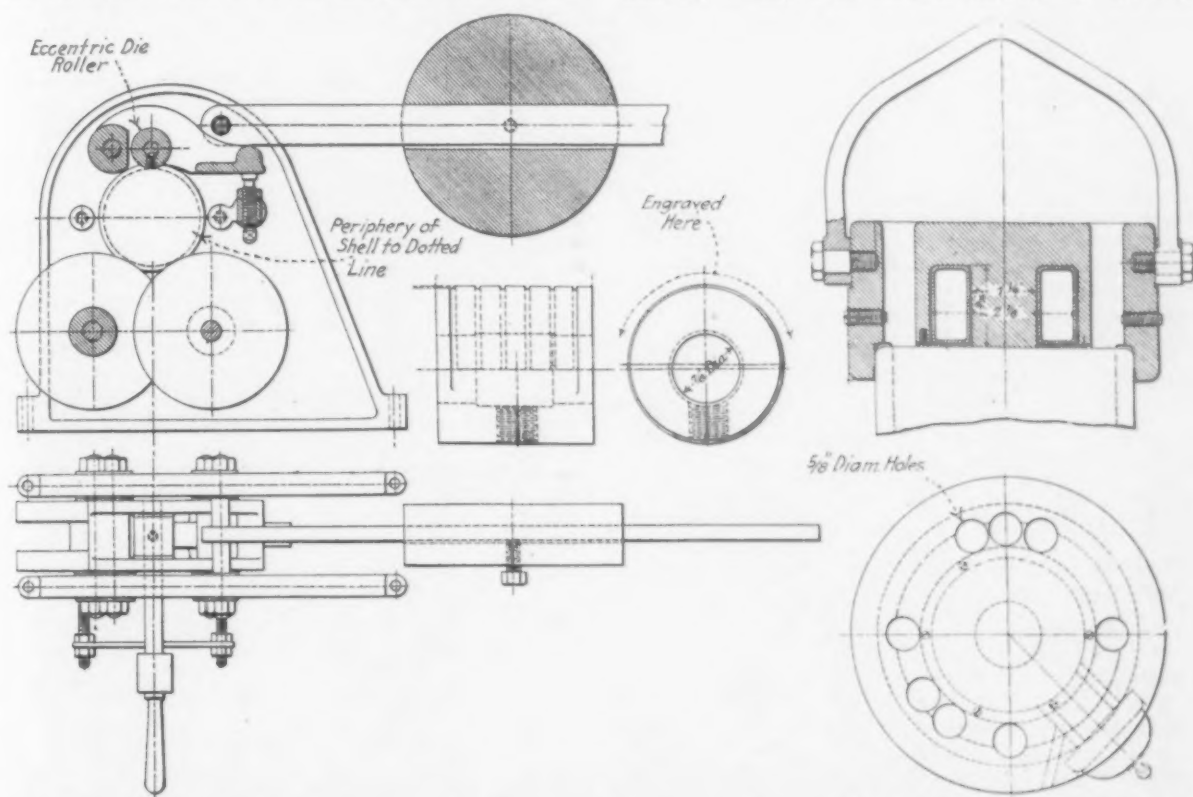
At the annual meeting of the New England Iron and Hardware Association, held in Boston June 19, Wilbur B. Ayer, Providence, R. I., vice-president, was elected president, and the other officers elected were: Charles W. Henderson, Jr., vice-president; Charles H. Breck, treasurer; George J. Mulhall, clerk.

The meeting was largely attended and the address of Charles A. Adams of the John B. Varick Co., Manchester, N. H., was cordially received. Mr. Adams reviewed business conditions as affected by the great war and said the slogan must be "Business Bigger Than Ever." "We must not lower the American standard of right living," said Mr. Adams. "Be thrifty, be busy, waste nothing, but be sure to keep this in mind—we cannot conduct a successful war, raise vast resources without general prosperity, and we cannot have prosperity when everybody starts to hedge. What will it profit America if we save a few dollars and bring about a commercial calamity? Every buyer and every seller, wholesale and retail, in every line of commercial endeavor, should wear down the influence of false econ-

### Two British Shell Marking Machines

To enable the marking of shells to be done by boy or girl workers, two special machines have been developed and built by Laurence, Scott & Co., Norwich, England. The machines are designed for marking the periphery and the base of shells with the various identifying marks called for by the Government specifications. The special feature of the peripheral marking machine is the use of an eccentric die roller, while a magnetic cap, which serves to secure the marking appliance to the base of the shell and also acts as an aid in lifting, characterizes the base marking device.

In the earlier forms of peripheral marker concentric rollers were employed and the weight which supplies pressure to the roller was lifted by hand every time a shell was inserted. The substitution of the eccentric roller does away with this, as the required permanent marking on the shell is cut on a portion of the roller as indicated in the illustration, reproduced from *Engineering*, apertures being left for the accommodation of removable characters for marking the date, the lot number, or any such variable notation on the shell.



The Periphery of the Shell is Marked by a Combination of Permanent and Removable Characters on an Eccentric Roller Actuated by a Weight, While Loose Dies Inserted Through Apertures in a Magnetic Cap at the Right and a Hammer Mark the Base, the Cap Also Serving to Lift the Shell from the Marking Table

omy. To make, advertise and consume, these attributes to success will prove our greatest weapon at home to combat the common enemy, whose wonderful power is largely due to the application of these principles among her subjects."

### Japan's Steel Imports in 1916

Japan's imports of iron and steel in 1916 showed a marked increase over those of the two previous years. The total for the principal items in 1916 was 668,762 tons, against 396,509 tons in 1915 and 551,694 tons in 1914. Imports of pig iron and ingots are given as 243,182 tons last year, as compared with 173,883 tons in 1915, and 178,639 tons in 1914. The value of imported locomotive and other engines, rolling stock and machinery is reported to have been £1,691,521 in 1916, as compared with £988,473 in 1915, and £2,748,492 in 1914.

M. K. Frank, Frick Building, Pittsburgh, dealer in second-hand machinery and factory and railroad equipment, has purchased the Juniata & Southern Railroad, a line 15 miles long.

The shell is now inserted when the marking portion of the roller, which is also that having the maximum eccentricity, is uppermost and the handle carrying the weight is pointing downward. In this way the simple action of turning the handle to mark the shell brings the weight automatically into operation. With this device, it is stated, the shells can be marked as fast as they can be fed into the machine, an output of 240 in 1 hr. being easily secured with a girl operator. The rollers have a long life even where they are of the removable type. One roller has marked as many as 40,000 high explosive shells, and while the wear is greater in the case of shrapnel it is not excessive.

The base marking machine is made in two sizes, the marking appliance in each being secured to the base of the shell by a magnetic cap. Loose dies are inserted through apertures of  $\frac{1}{8}$  and  $\frac{3}{8}$  in. in diameter according to the size of the machine and are kept in position against rotation and falling out by feathers. With this exception the dies are loose and the marking is done by a hammer. The cap serves, too, for lifting the shell in conjunction with an ordinary hand block. It is possible to handle and mark 60 shells in 1 hr. with boys or girls doing the work.

# Sixteen Cities for the New National Army

Cantonments Providing for 40,000 Men  
Each to be Built in Two Months at Cost  
Plus Profit—Use of Steel to be Avoided

WASHINGTON, June 26.—Sixteen cantonments for the new National Army, each a little city with a ready-made population of 40,000, will be established by the War Department on or before Sept. 1, if the elaborate plans nearly completed by the Quartermaster General are carried through on schedule time. But 150 cities in the United States are larger, either in area or population, than these cantonments will be and, although the housing of the 600,000 recruits will be a mushroom growth, the buildings will be of a substantial character, well suited for the comfort as well as the shelter of soldiers in training and equipped with every necessary modern convenience planned with especial reference to the soldiers' health.

The sites for the 16 cantonments are necessarily scattered throughout the country in order that the travel of the recruits may be kept at a minimum and also to facilitate construction. In view of the enormous quantities of material required to build these 16 cities any concentration would at once result in railroad congestion that would still further accentuate the existing transportation problem. So expeditiously has the preliminary work been carried on that all the sites have been chosen, contracts for 12 of the cantonments have been let and a constructing quartermaster assigned to supervise the building of each town.

## Sites and Contractors

Following is a list of the sites, the contractors who will build the cantonments and the quartermasters under whose eyes the construction will proceed:

Division and Location	Contractors	Constructing Quartermasters
1. Ayer, Mass.	Fred. T. Ley & Co., Springfield, Mass.	Capt. Edward Canfield, Jr.
2. Yaphank, L. I.	Thompson-Starrett Co., New York	Maj. O'Kelly Williams
3. Wrightstown, N. J.	Irwin & Leighton, Philadelphia	Maj. Harry C. Williams
4. Annapolis Junction, Md.	Smith, Hauser & M. F. McIsaac, New York	Maj. Ralph Fenner Proctor
5. Petersburg, Va.	Rhinehart & Dennis Co., Charlottesville, Va.	Capt. Frank P. Edwards
6. Columbia, S. C.	Hardaway Construction Co., Columbus, Ga.	Maj. William Couper
7. Atlanta, Ga.	Arthur W. Tufts Co., Atlanta, Ga.	Maj. James Norman Pease
8. Chillicothe, Ohio	A. Bentley Co., Toledo, Ohio	Capt. Ward Dabney
9. Louisville, Ky.	Mason & Hanger, Richmond, Ky.	Maj. Frank E. Lampher
10. Battle Creek, Mich.	Porter Brothers, Detroit	Maj. Earl Bell Morten
11. Rockford, Ill.	Bates-Rogers Co., Chicago	Maj. Donald Hubbard Sawyer
12. Little Rock, Ark.	James Stewart & Co., Chicago	Maj. John R. Fordyce
13. Des Moines, Ia.	Charles Weltz's Sons, Des Moines, Iowa	Maj. Millard Angle Butler
14. Ft. Riley, Kan.	George A. Fuller Co., New York	Capt. Frederick J. Horman
15. Ft. Sam Houston, Texas	Stone & Webster, Boston	Capt. George E. Thorne
16. American Lake, Wash.	Hurley, Mason & Co., Tacoma, Wash.	Capt. David L. Stone

The building of 16 towns of 40,000 inhabitants each in two months is a novel proposition and novel methods have been resorted to to render it possible. The 12 contracts already let have been awarded without plans, specifications, accurate bills of materials or the taking of bids. Contractors have been selected on a basis of reputation. A set of questions was confidentially sent out to all the leading contractors of the country asking them to tell of the work they have done in the last three years and how large a number of men they would probably be able to employ if awarded a contract for a cantonment. In addition to this, confidential inquiries were sent to leading engineers and architects

asking them about each contractor, his integrity, reputation for finishing work on time, equipment, etc. The answers to these questions were placed in the hands of an individual believed by the War Department officials to be one of the best judges of contractors and their work in the country. On this basis the contractors have been selected.

## Contracts on Cost-Plus-Profit Basis

In default of detailed plans and specifications and in the absence of competition on price, the War Department has found it necessary to let the contracts on a cost-plus-profit basis. This basis was decided upon by the Emergency Construction Committee, chosen by the Council of National Defense to assist the Quartermaster's Corps only after weeks of study to develop a system which would assure the country of the highest grade of work from the contractors and at the same time prevent extravagances through the payment of excessive profits. The War Department pays the contractors of the country the high tribute in an official statement that "they have acquiesced willingly in the proposition and profits have been kept down to the lowest level consistent with high grade work, while some firms have offered to build cantonments at cost, offers which the officials did not regard it as wise, either economically or nationally, to accept." The utmost speed and efficiency must be developed in this and future building jobs for the Government and the officials believe that the acceptance of offers of free service "might easily disrupt the high grade contracting firms best qualified to do the work effectively."

## Contractors' Fees

The total estimated cost of the cantonments is \$55,000,000 and it is calculated that the most expensive should be constructed for not to exceed \$4,000,000. As fair compensation to the contractor a sliding scale of fees representing profits has been agreed upon, ranging from 10 per cent on small contracts of \$100,000 or less to 6 per cent on all contracts of more than \$3,500,000 with a final upset limit of \$250,000, which will be the largest fee paid for any job undertaken by a single contractor. The fees in all cases cover both profit and overhead expenses. The average estimate of a contractor's overhead expenses which the Emergency Construction Committee has received is 3½ per cent, so that the net profit on a \$3,000,000 contract will be one-half of the \$210,000 fee, or \$105,000. As the contracts increase in size, however, the overhead expense tends to decrease and the committee, therefore, has reduced the fee to 6 per cent on all contracts above \$3,500,000 and established the upset limit referred to. The schedule of fees is as follows:

On work under \$100,000, 10 per cent of cost.  
On work over \$100,000 and under \$125,000, a fee of \$10,000.  
On work over \$125,000 and under \$250,000, 8 per cent of cost.  
On work over \$250,000 and under \$266,666.67, a fee of \$20,000.  
On work over \$266,666.67 and under \$500,000, 7½ per cent of cost.  
On work over \$500,000 and under \$535,714.29, a fee of \$37,500.  
On work over \$535,714.29 and under \$3,000,000, 7 per cent of cost.  
On work over \$3,000,000 and under \$3,500,000, a fee of \$210,000.  
On work over \$3,500,000, 6 per cent of cost.  
The total fee to the contractor shall in no event exceed the sum of \$250,000, any agreement to the contrary notwithstanding.

### Reimbursement on Various Outlays

On the basis of this schedule of fees the Government agrees to reimburse the contractor on the following items for which he makes an outlay:

1. All labor, materials and machinery necessary for the work. No departure from the standard rate of wages in the locality may be made without the consent of the Government's representatives.
2. All sub-contracts.
3. Rental for construction equipment hired or owned by the contractor, at rates fixed in detail on the contract. The rates may be judged from the daily rental of \$5 permitted for the use of an automobile.
4. Transporting, setting up and dismantling such equipment.
5. Transportation of field forces engaged in the work.
6. Salaries of resident engineers, superintendents, timekeepers, foremen and other men in the contractor's field office.
7. Buildings, field office supplies, equipment, commissary department and hospital expenses required during construction.
8. Insurance and bonding expenses, uninsured losses and expenses incidental to the work and approved by the Government's representatives.
9. Fees, deposits, royalties and similar necessary expenses.
10. Transportation, traveling and hotel expenses of contractor's employees actually incurred in the work.

Provision is made for monthly payments for actual expenses approved by the Government's representatives who will have access at all times to the accounts kept by the contractor. This puts the minimum strain on the contractor's financial resources, while giving the Government a complete check on the accuracy and propriety of every item before payment is made.

### Material and Transportation Problems

The most serious problem confronting the Government in this great undertaking is the purchase and transportation of the enormous amount of material necessary for the construction of these 16 cities. The Emergency Construction Committee, having general charge of this work, is composed of W. A. Starrett, Starrett & Van Vleck, chairman; C. M. Lundoff, Crowell, Lundoff, Little Co., Cleveland; M. C. Tuttle, Aberthaw Construction Co., Boston; Maj. William Kelley, office of Chief of Ordnance, United States Army; F. L. Olmstead, landscape architect, and J. B. Talmadge, secretary. This committee has enlisted the co-operation of a large number of engineers, city planners, water and sanitary experts, and has also requisitioned all the subcommittees on material of the Council of National Defense. The Railroad Committee, of which Daniel Willard, president of the Baltimore & Ohio Railroad, is chairman, has also been called upon to assist and already a number of important railroad systems have provided spurs and sidings at cantonment sites in order to handle material expeditiously and avoid unnecessary transfers.

### A Thousand Houses for Each City

Each cantonment will consist roughly of about 1000 houses scattered over an area of from 1500 to 3000 acres, which will include parade grounds, maneuvering spaces and rifle ranges. The typical company barracks will be a two-story structure built of wooden frame covered with matched boards. The roofs will be covered with prepared roofing. The buildings will be well ventilated with flues and lighted by electricity. The cantonments in the South will be heated by stoves, but no decision has yet been reached concerning the heating of those in the northern sections, although the Emergency Construction Committee now favors the use of steam. Each barracks will contain a large mess hall and kitchen.

The distribution of the barracks and auxiliary buildings will be determined by an engineer or town planner, who will lay out each cantonment in conformity with the topography of the location, taking into consideration railroad trackage, wagon roads, drainage and the like. As no two sites are alike, the layout of

the cantonments will vary greatly; hence the Emergency Construction Committee has not attempted to prescribe a hard and fast type of plan.

Some idea of the size of this job may be gained from a glance at a rough estimate of material for a typical cantonment made by the committee. Lumber is the big item, some 26,000,000 ft. or 1325 carloads being required. Crushed stone for the roads will make 812 carloads, and concrete foundations will call for 350 carloads of stone, 172 carloads of sand and 70 carloads of cement. Railroad materials for spurs and sidings, estimated at five miles for each cantonment, will include 30 carloads of ties and other timber, 20 carloads of rails, fish plates, spikes, etc., and 114 carloads of ballast. The lighting system of each cantonment will require 10 carloads of poles, wires, insulators, etc. It is estimated that 20 carloads of nails and hardware will be used in each cantonment, 20 carloads of plumbing fixtures and piping, and 192 carloads of tanks, heaters, stoves, ranges, refrigerators, etc.

### Economizing Steel

Owing to the unprecedented demand for iron and steel for all purposes, the designers of the cantonments are seeking to avoid its use wherever possible. The water mains will be wooden pipes and no structural steel whatever will be employed with the exception of a small quantity necessarily used in the boiler and power plants, but even this requirement will be reduced to a minimum by the utilization of current taken from electric lighting plants in neighboring towns.

It is estimated that 42,640 kegs of nails will be required for the 16 cantonments, or 2665 kegs each, distributed as follows: 550 kegs 20-penny, 456 kegs 10-penny and 1200 kegs 8-penny common wire nails; 10 kegs 10-penny, 90 kegs 8-penny and 40 kegs 6-penny finishing wire nails; 231 kegs 6-penny casing wire nails, 83 kegs 1½-in. roofing nails and 5 kegs ¾-in. roofing nails.

### Plumbing and Radiation

The plumbing work for the 16 cantonments calls for about 1,600,000 ft. of ¾ to 2½-in. galvanized pipe, 20,000 nipples, 30,000 unions, 225,000 malleable fittings, 30,000 shower bath heads, 40,000 closets and tanks, 12,000 urinal troughs, 9000 lavatory troughs, 23,000 floor drains, 5000 roof flashings, 95,000 ft. of cast-iron sewer pipe, 150,000 ft. of soil pipe fittings, 822,000 lb. of calking lead, 91,000 lb. of oakum, 8000 terra cotta grease traps, 8000 cast-iron sinks, and 6000 galvanized range boilers. No accurate estimates have yet been made as to the number of ranges and heating stoves that will be required and it will be impossible to secure figures concerning radiation and steam piping until the Emergency Construction Committee has determined upon the heating system to be employed in the cantonments located in northern districts.

In view of the skepticism generally prevailing, even among those familiar with building operations, concerning the ability of the Government to have the cantonments finished on schedule time, the War Department calls attention to the fact that on May 14 the Quartermaster General's Department received instructions to have quarters on June 15 for 150,000 men, involving the erection of new buildings at nine posts at a cost of about \$7,000,000. This work is now practically finished and in addition the Quartermaster's Department has erected four camps for medical reserve officers, each accommodating 600 men, and 24 camps for members of the officers' reserve corps, each having, in addition to the buildings for the men, quarters for four hospital units and four ambulance units. As the new army cantonments involve substantially the same class of construction, though on a much larger scale, the authorities are confident that the entire 16 towns will be ready by the time the recruits have been chosen through the selective conscription process. W. L. C.

Herman A. Holz, dealer in metal testing instruments, has removed from 50 Church Street to 1 Madison Avenue, New York.



# The Heat Treatment of Large Forgings

## Precautions to Be Observed When Forging Is of Irregular Section or Too Large to Obtain Adequate Working and Heating

BY SIR WILLIAM BEARDMORE

FOR every class of forging it is desired that the material composing it should give the mechanical tests required by a suitable choice of composition. It is also necessary that the material should be in such a physical condition that brittleness and the chance of sudden failure are reduced to an absolute minimum. Carbon steel forgings produced to meet a definite mechanical test specification must possess the least crystalline growth or the smallest grain size. The object of all heat treatment is to confer this condition on the forging. The time that the material is kept at its maximum temperature and the time taken to cool down have an important influence on the grain size. A limit is ultimately reached in the size of the forging beyond which a plain carbon steel cannot be used with safety, and the use of an alloy steel becomes imperative.

As heavy masses of steel cool slowly large grain crystals result at the center. To avoid these the cooling has been hastened by means of oil quenching and a subsequent heat treatment is necessary to remove the hardness resulting from the quenching. With small forgings a simple annealing will be satisfactory, but for large forgings some form of heat treatment is necessary to obtain the best results.

In plain carbon steel the effect of oil quenching diminishes with the distance from the outside surface. With large forgings, therefore, the quenching effect at the center is so small that it is insufficient to confer any benefit on the material. The effect is shown by the following results obtained from a shaft 18 in. in diameter of the following composition in percentage:

Carbon, 0.18; manganese, 0.65; silicon, 0.10; sulphur, 0.048; phosphorus, 0.037.

The casting was heated to 820 deg. C., held at this temperature two hours and cooled in oil. Table 1 shows the results of test pieces on the outside skin and at the center:

Table 1—Effect of Heat Treatment at Outside and Center of a Large Forging

Location of Test Piece	Elastic Limit, Tons per Sq. In.	Ultimate Stress, Tons per Sq. In.	Elongation in 2 In., Per Cent	Reduction of Area, Per Cent
Outside	17.5	33.1	27.0	53.1
Center	15.0	29.0	31.0	46.0

Photomicrographs of the outside skin showed exceedingly fine grain crystals, while those of the center showed an exceedingly coarse and widely separated grain crystal.

There is an intimate relation between the grain condition of a forging and the amount of work undergone during the forging operation. For the best results the ratio of cross section of the ingot and the largest cross section of the forging should have a minimum value of not less than three. For an ingot 83 in. in diameter the maximum size of the forging should not exceed 48 in., and larger forgings than this should be built up rather than attempted in one piece. While not strictly a forging, the following example illustrates the foregoing statement regarding the heat treatment of heavy forgings: Steel discs 55 in. diameter, 11 in.

\*From a paper read before the Institution of Mechanical Engineers, Great Britain, March 16, 1917.

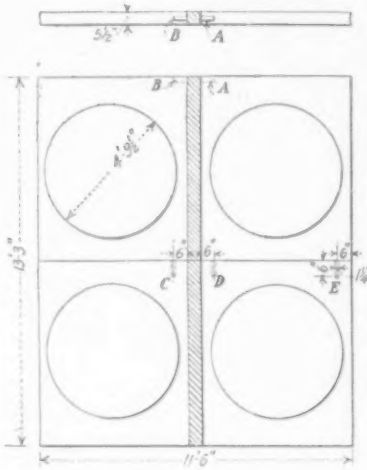


Fig. 1.—Forged and Rolled Slabs Used for Tests

thick were required to revolve at a high speed. The ingots, containing carbon 0.53 to 0.54 per cent, silicon 0.18, manganese 0.50, sulphur 0.029, phosphorus 0.040 per cent, were given a heat treatment after rolling, consisting of: (1) Heating to 780 deg. C. for two hours and cooling in oil. (2) Heating to 550 deg. C. for four hours and cooling in air.

Test pieces from the center of the slab gave results as shown in Table 2, which also gives the required properties. The reasons offered for the failure of the material to meet the specifications were too low carbon and too great thickness of the slab to allow the oil quenching to take sufficient effect to attain the highest tonnage required.

Another ingot was cast from a higher carbon material, containing carbon 0.62 to 0.63 per cent, silicon 0.25, manganese 0.70, sulphur 0.023, phosphorus 0.024 per cent.

Table 2—Results of Tests from the Center of the Slabs

	Yield Point, Tons per Sq. In.	Ultimate Stress, Tons per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent
Test results specified...	23.0	45.0	20.0	39.3
Test results obtained...	23.6	42.3	14.0	39.3

After rolling to 5 1/2 in. thick, a heat treatment was given consisting of (1) Heating to 900 deg. C., holding for one hour and cooling in oil. (2) Heating to 760 deg. C., holding for one hour and cooling in oil. (3) Heating to 640 deg. C., holding for eight hours and cooling in air.

Test pieces taken from the various locations A to E in Fig. 1 gave the results shown in Table 3.

Table 3—Results of Tests of Pieces from Various Locations in Fig. 1

Fig.	Yield Point, Tons per Sq. In.	Ultimate Stress, Tons per Sq. In.	Elongation in 2 In., Per Cent	Reduction of Area, Per Cent	Fracture
A	28.1	46.2	28.0	52.4	Silky fibrous
B	27.9	46.0	27.0	44.4	10 per cent fibrous.
C	27.2	46.6	25.0	47.2	90 per cent fine gran.
D	26.4	46.0	26.0	42.0	40 per cent fibrous
E	26.8	46.2	27.0	44.4	60 per cent fine gran.
					30 per cent fibrous.
					70 per cent fine gran.
					50 per cent fibrous
					50 per cent fine gran.

These results show the improvement effected by building up the discs from two 5 1/2-in. slabs rather than attempting to manufacture an 11-in. disc in one piece.

The beneficial effect of working is illustrated by Table 4 which shows the test results after the original 11-in. slab had been re-rolled down to 5 1/2-in. and heat treated according to the second method.

Table 4—Results After the Original Slab Had Been Re-rolled Down to 5 1/2 In.

	Yield Point, Tons per Sq. In.	Ultimate Stress, Tons per Sq. In.	Elongation (Ratio Length 10), Per Cent	Remarks, In. Thick
Length	26.3	44.9	15.8	5 1/2
Cross	25.7	44.2	16.5	5 1/2
Cross	23.6	42.3	14.0	11

For material over 40 tons tensile strength per sq. in., where the factor of safety is limited owing to the special conditions under which the material must be employed, it will generally be safer to use an alloy steel. But for material whose tensile strength is below this

figure there is not the same necessity, and excellent results can be obtained from oil-treated low-carbon steel.

Fig. 2 is a sketch of a rotor spindle, made to the specification of yield point, 20 tons per sq. in.; ultimate stress, 36 tons per sq. in.; elongation in 2 in., 24 per cent. If an ingot were used which would give the requisite amount of work for the largest section the cost of forging the ends down to 11 in. would be out of all proportion. A compromise to bring the best metallurgical and best commercial conditions was effected by using a 60-in. ingot of the composition:

Carbon, 0.38; manganese, 0.39; silicon, 0.21; sulphur, 0.029; phosphorus, 0.044 per cent.

Since the end piece, 11 in. in diameter, could be heated in about 4 hours, while the center would require 20 hr., the end pieces would have been at their heat for 16 hr. before the temperature of the forging became uniform. The crystalline grain in the ends would in this time grow to such size as to nullify any good effect of the oil treatment. The ends were, therefore, covered with asbestos sheets leaving only the center exposed when the forging was charged into the furnace. The sheeting was removed at the end of 15½ hr. so that the forging attained its heat uniformly as a whole. The grain crystals in consequence were uniform throughout. Test pieces from the locations shown in the illustration gave the results presented in Table 5.

Table 5—Results of Tests from Various Locations in Fig. 2

Fig. 2	Yield Point, Tons per Sq. In.	Ultimate Stress, Tons per Sq. In.	Elongation (in 2 in.), Per Cent
A.....	22.6	38.8	27
	22.8	39.2	27
B.....	22.8	39.2	28
	22.4	38.8	28
C.....	22.4	38.8	30
	22.4	35.8	24

The heat treatment consisted of (1) Heating to 800 deg. C. for 2 hr. and cooling in oil. (2) Heating to 550 deg. C. for 11 hr. and 30 min. and keeping at that heat for 2 hr.

Large forgings which have been heat treated are

absolutely necessary to take temperatures at every stage, not only of the furnaces but, in the case of heavy forgings, of the forgings themselves. If that were done, and provided the steel in the first place was of suitable quality, it could be almost guaranteed that there would be little or no trouble.

On the other hand, in steel which was peculiarly sensitive to treatment, that is, irregular treatment, undue crystallization or strains would be set up in the forging produced. For instance, if the operator started with ingots, and not billets or rough forgings, then, especially with the harder steels, it was decidedly inadvisable to put cold ingots into a hot furnace. In other words, the temperatures of the furnace and the ingot should rise together so as to insure a slow and consistent heat treatment. Even with such special steels as manganese steel and nickel-chromium steel, provided care was taken to very gradually heat the object which it was desired to forge, success could readily be obtained. For instance, if the ingot was allowed to cool near the furnace, where the temperature was, perhaps, 200 or 300 deg., the chance of success was much greater than if the ingot was allowed to cool in the open air.

Further, great care should be exercised in controlling the cooling conditions, so that in having a heap of blanks cooling one blank should not touch another. By doing this all the blanks cooled down uniformly and evenly. In this connection one often heard of "normalized" steel, which was really a very proper attempt to produce steel which had been heated to a known and reasonable temperature and cooled in a known and definite manner and time. They were beginning to pay a great deal of attention to this matter in America. In one case a large steel works took the temperature of several hundred heats and found that by proper supervision and control the temperature of the fluid steel did not vary more than 30 deg. C. If it were possible to do this over such a large number of forgings with such high temperatures, it was high time that we learned how to do the same thing not only with ordinary steel but with the special steels. It had often been

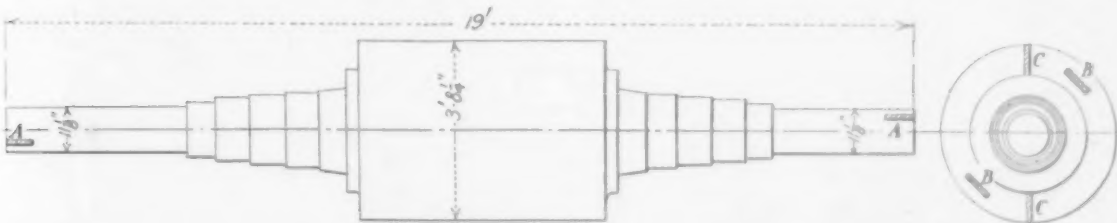


Fig. 2.—The Ends of This Rotor Spindle Were Covered with Asbestos While the Large Central Portion Was Being Heated, Thus Bringing All Parts of the Piece to Annealing Temperature at a Uniform Rate

subject to distortion due to internal stresses probably set up by the operation of quenching. On machining a forging these stresses are partly relieved and the forging takes up a new shape under the influence of the forces still remaining in the material. It is advisable on this account to rough machine the forging after treatment and to then re-anneal it before final treatment. Allowance for this re-annealing can be made on the first testing, and, where the final machining is intricate and accurate it will be found to well repay the cost.

Discussion

Sir Robert Hadfield in discussing the paper, said that his experience had not been in small numbers of large forgings, but in large numbers of smaller forgings, but he was not aware of a single case of failure at the front of any British-made forging through faulty material.

Speaking of his own company's experience in making these forgings, they were exceedingly careful to have special attention paid to temperatures, whether of the reheating furnaces or of the subsequent operations, by means of optical and other pyrometers. The old-fashioned way of taking an ingot or forging and heating it up to a "certain color," indicating what the foreman thought was correct, was passing away. It was

stated that constant vibration would set up a particular kind of crystallization in a steel article. His own experience, however, was that properly-treated steel did not break in this manner. Moreover, the old theory that large crystals were formed in improperly-treated steel was incorrect. Large crystallization, as seen in many fractures, was there because the original structure was coarse.

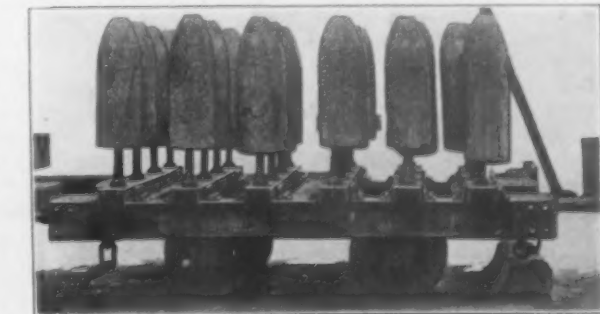


Fig. 2.—The Shell Forgings Are Supported on Uprights on an Industrial Car with Sufficient Space Between Blanks to Admit of a Free Circulation of Air

## PREPARING FOR EXPANSION

### Building of Aircraft Expected to Grow with Great Rapidity

Preparations to carry out the Government program for aircraft construction have already been begun. President Wilson has formally approved the plan calling for the appropriation of \$600,000,000 by Congress with which to build a tremendous airplane fleet. The Aircraft Production Board, which is a sub-committee of the Council of National Defense, has paved the way for airplane production by assisting in the organization of an association of aircraft manufacturers, and has developed plans for types of machines both for training aviators and for battle uses. However, the aviation industry of the United States is not sufficiently large to handle the great number of airplanes that the Government will probably require, and the automobile industry will be largely depended upon to carry out the plans successfully.

One of the most important steps toward airplane building is the combination between the Curtiss Aeroplane & Motor Corporation and the Willys-Overland automobile interests. C. M. Keys, vice-president of the Curtiss Corporation, has made announcement of the plans of the Curtiss Corporation for making airplane motors, in part as follows:

A working arrangement between these two corporations, each a leader in its line and each supplementing the other to perfection, is the most obvious solution that could be devised for a very big and very momentous problem brought about by the war. This problem was, in effect, to bridge in six months the gap between the experimental and the production stages of an industry. The Curtiss corporation is largely an assembling proposition, so far as manufacturing is concerned. It obtains its parts both for aeroplane and motors from a very large number of vendors throughout the country. Some of its principal manufacturing obstacles have arisen from the natural difficulty in obtaining and keeping close co-ordination between so many sources of supply scattered all over the country.

We do not know as yet the exact terms upon which these two corporations will co-operate in manufacturing. At the present time the working arrangement between them is intended to furnish to the United States Government and to the Governments of Great Britain and Canada stronger, bigger and better sources of supply for aeroplanes, motors and equipment.

John N. Willys has been elected president of the Curtiss Corporation. Work has already been begun on buildings in Toledo, to cost, with equipment, about \$3,000,000, which will be used for making airplane motors.

The Nordyke & Marmon Co., Indianapolis, has contracted for the construction of a one-story factory building 100 x 350 ft. to be completed in 60 days, to provide additional facilities for the manufacture of airplane engines for the Government. The new building will be constructed on a 21-acre site adjoining the present Marmon automobile factory.

The General Vehicle Co. is already at work on the manufacture of airplane motors and the Duesendorf Motors Corporation, Equitable Building, New York, is erecting a new plant at Elizabeth, N. J., which will also make airplane motors and is devoting its present plant at Edgewater, N. J., to that work.

Parts of motors are now being made at the Willys-Overland factory at Elmira, N. Y., and the Curtiss Aeroplane and Motor Corporation has leased space in three Buffalo manufacturing establishments in order to speed work on airplanes begun some time ago. The Wright-Martin Aircraft Corporation is also devoting its facilities to United States Government work.

It is probable that the manufacture of engines for airplanes will be standardized, and the facilities of a great number of factories will be utilized for making parts.

#### New Society Assisting Government

The Society of Industrial Engineers, through the Council of National Defense, has been assigned the task of compiling data on plants in the United States

that are in position to manufacture aircraft, parts or accessories. The Society of Industrial Engineers was organized in Chicago, May 26, at the close of the national conference on "Industrial Preparedness," held under the auspices of the Western Efficiency Society.

In addition to gathering data on plants available for the manufacture of aircraft and parts, the society is compiling information on available industrial engineers whose knowledge or training would be of value to the government. Charles Buxton Going, chairman of the board of directors of the society, has taken up his residence and opened an office in Washington, to be in close touch with the Council of National Defense and the work of the society generally. S. T. A. Loftis, treasurer, and G. C. Dent, assistant treasurer and secretary, are located at the society headquarters, 327 South La Salle Street, Chicago.

### Survey of Industrial Plants

The Industrial Department of the Fairfield County Association for the Mobilization of Resources has undertaken a thorough survey of the industrial plants of Fairfield County, Conn., of which Bridgeport is the most important city. The association recently has issued a bulletin giving an outline of the work undertaken by the Industrial Department under the leadership of H. E. Harris of the H. E. Harris Engineering Co., Bridgeport. The program includes:

1. Study of fuel sources, storage and distribution to guard against a shortage that would cripple plants.
2. Study of raw material sources, storage and distribution and means of transporting same to plants.
3. Study of distribution of work in factories with a view to attaining utmost efficiency in its handling.
4. Study of plants for accommodation of war business, particularly those not adapted directly for munitions manufacture and whose organizations would be depleted through lack of work caused by the war.
5. Classification of labor in Fairfield county.
6. Study of the question of meeting the loss by conscription with women and apprentices in Fairfield county factories.
7. Plans for the internal and external protection of industry during the war period.
8. Assisting the national defense propaganda by enlisting every man, woman and child in the speeding up of production and the prevention of waste of raw material.
9. Establishment of a central calibration office for the measurement of instruments of precision, and the co-ordination of this work with the Bureau of Standards at Washington, utilizing such personnel and equipment as can be had locally and securing such additional equipment as may be necessary.

As a considerable number of the more important munitions, machine tool and brass plants of the country are located in Fairfield County, the establishment of a calibration office is expected to become an asset of great worth during war times, and its projectors hope to see it established so firmly that it may be continued in times of peace.

### The War and Holland's Steel Trade

That the war has seriously interfered with Holland's export and import business in iron and steel is shown by the following comparisons of the totals for each year in tons:

	1914	1915	1916
Imports .....	1,123,204	680,481	500,378
Exports .....	669,643	174,246	58,007

The imports have been cut in two since 1914 and the exports have fallen to less than one-tenth what they were previous to the war.

Following the completion of contracts with the European governments, the Artillery Fuse Co., South Wilmington, Del., has closed its plant. The company recently employed about 3000 people. It is said that the plant is soon to be reopened.

The Sterling Iron & Steel Co., dealer in second-hand machinery, has removed from 1010 Hamilton Street to 463 North Tenth Street, Philadelphia.

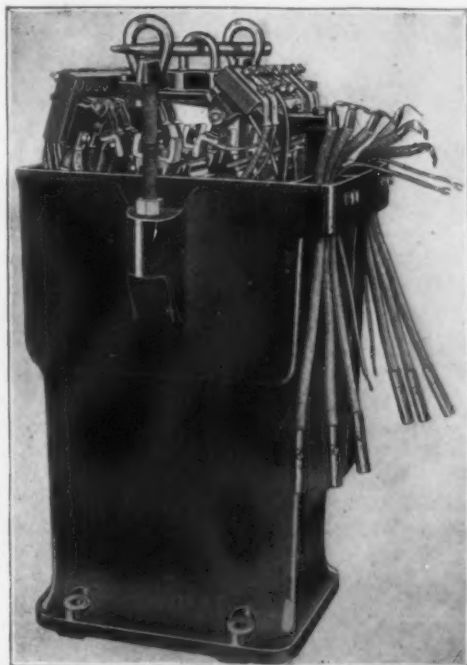


## Automatic Starter for Induction Motors

In a paper recently presented before the Association of Iron and Steel Electrical Engineers by H. F. Stratton, vice-president Electric Controller & Mfg. Co., Cleveland, an automatic starter for squirrel cage motors is described. This is known as an automatic compensator, and, it is stated, can be installed by an electrician of ordinary ability and operated by any one who knows enough to push a button for starting and another for stopping, and under ordinary conditions will run for years without attention.

In a general way the compensator starts a squirrel cage motor in the customary way, the motor initially receiving a reduced voltage through a transformer, this reduced voltage being withdrawn and the line voltage applied to the motor after a considerable speed has been obtained. This, however, is the only point of similarity between the compensator and the equipment ordinarily employed.

The compensator is housed in an iron case having a weatherproof cover that is held in place by eyebolts. These bolts also furnish a means for attaching a crane



Squirrel Cage Motors Can Be Operated by Pushing a Button with This Automatic Starter. The Change from the Starting to the Running Connections Being Automatically Made

or a hoisting apparatus to the compensator for convenient handling.

The machine itself is built in one unit which slips into the case from the top and is almost completely submerged in oil. It includes a transformer with multiple voltage taps and a U-shaped magnet, the lower pole of which is surrounded by the operating coil and the resistance unit. There is only one operating magnet for the entire mechanism, and this, when energized, must establish the starting connections, and after a delay permit these to be broken and the running connections to be established. This change is accomplished by a transition relay which operates a latch lever, the movement of which throws the movable contacts from the starting to the running side, thus disconnecting the motor from the transformer and connecting it to the line.

In operation, the magnet is excited, closes the armature, compresses a spring, and connects the motor to the source of current supply through the transformer. After the motor has attained the proper speed, the transition relay operates a latch permitting the spring to disconnect the motor from the transformer and the transformer from the line and connect the motor to the line. When the operating magnet is de-energized by moving the handle to the off position, the armature falls open and the motor is disconnected from the sup-

ply line. The compensator is submerged in oil with the exception of the terminal board used for connecting the transformer voltage taps. The oil, which is of a special type with high flash point, is relied upon to cool and insulate all current carrying parts, lubricate the moving parts, and quench the arc which is formed when the contacts are separated. On account of the large volume of oil and the freedom with which copper particles and carbon can settle to the bottom of the tank it is stated that at least five years of average service can be secured before the oil has to be changed.

## Plans of the Liberty Steel Co.

The Liberty Steel Co., which is building a new sheet mill plant at Warren, Ohio, which was to have originally contained six hot sheet mills, has decided to add another 54-in. mill, together with a pinion roughing mill, and a 44-in. mill with a pinion roughing mill, while the remainder will be 38-in. mills, with jump roughing mills. The company will be able to manufacture as heavy as 8-gage blue annealed sheets, and as light as 30-gage black sheets. It will concentrate all its efforts in the manufacture of a high-grade finished sheet, but in starting operations it will likely produce quite a quantity of blue annealed sheets, this depending on the market for these at the time the company is ready to start. The company will also use powdered coal equipment for firing its heating furnaces, and all mills will be entirely electrically driven. The company will increase its capital stock from \$200,000 preferred to \$250,000, and from \$400,000 to \$500,000 common stock. Bonds to the amount of \$150,000 to run 10 years and bear interest of 6 per cent have also been authorized. The first units of the new sheet mill are expected to be ready to start about Feb. 1, 1918. E. F. Clark, president, states that very satisfactory progress has been made in the construction work thus far.

## Summer Course in Management

The Pennsylvania State College, State College, Pa., will conduct its third summer session in factory organization, cost accounting and scientific management, Aug. 6 to 18. The course is intended for industrial executives and department heads and the number of students is limited to 30. Instruction is offered in making time and motion studies, preparation of instruction cards, preparation of tool lists, preparation of bills of material, routing, scheduling order of work, conducting tool room, conducting store room, and time and cost records. Prof. Hugo Diemer, industrial engineering department, will be in charge.

The Transmission Ball Bearing Co. has moved into the first unit of its new plant at 1050 Military Road, Buffalo, with about two and one-half times the capacity it had before. This new unit is the first of five buildings 200 x 100 ft., to be erected on the new seven-acre plot recently purchased just outside the Buffalo city line, and as rapidly as possible facilities will be added to increase the manufacture of ball bearings, shaft bearings and hangers, ball races, and the company's universal elevating shop truck. A heat treating plant with Tate-Jones furnaces has been added.

Members of the Iron Moulders' Union in Youngstown, Ohio, have made a demand for a minimum wage rate of \$5, effective July 1, at the expiration of the present agreement. For several years past a minimum rate of \$4 has been paid journeymen moulders in that city.

The Federal Export Corporation, together with its subsidiary, the Commercial Iron & Steel Corporation, Inc., will move July 1 from its present quarters, 115 Broadway, New York, to the front half of the tenth floor of that building.

The Wilkoff Co., Youngstown, Ohio, wholesale dealer in scrap iron and metals, has just increased its capital stock from \$300,000 to \$600,000.

# Defects in Finished Rolled Steel

Mechanical Ones Due to Quantity, Not Quality, of Output — Slag Inclusions, Splits in Rails and Manufactured Pipes

BY GEORGE W. DRESS\*

WITHOUT making a comparison between the methods of manufacturing steel to-day and those of a number of years ago, a large percentage of the defects in finished products is due to quantity of output instead of quality. With a proper study of the first cause of mechanical defects and by exercising good judgment, it is possible to eliminate many of these defects without materially affecting the quantity.

## Defects Due to Slag Inclusions

An important mechanical defect of finished rolled steel is a very rough surface, or a steel having a decidedly pitted surface in which may be seen slag inclusions. The first mechanical cause of this defect is the reheating of the ingot. The average steel man is familiar with the surface condition of ingots. By close observation small pinholes may be seen, irregularly distributed over the surface of the ingot. The pinholes form external orifices for larger gas cells which also lie close to the surface.

If the reheating is carefully done and the ingots are thoroughly soaked at normal rolling or working temperatures, one need not anticipate any serious surface defects in the finished steel, provided no undue punishment is inflicted in the subsequent reworking. On the contrary, if the ingots are subjected to high temperatures and the slag begins to run, as is often the case, then one may be sure to have the following conditions:

The external pin holes in the ingot are expanded and the running slag finds its way through the pin holes and finally enters the gas cells which lie close to the surface. The ingots are rolled and the slag

high temperatures maintained in the reheating of the ingots, but also because the slag is more tenacious in this grade of steel due to the oxide of chromium contained therein.

Fig. 1 shows the surface condition of a slab after having been thoroughly pickled in a 20 per cent solution sulphuric acid. The normal scale is removed and the black spots are the embedded slag inclusions. Fig. 2 is that of a cold-rolled plate, the dark portions being due to embedded slag which would not free itself from the slab from which it was rolled.

## Splits or Cracks in Rails

Splits or cracks, as found in rails, vary considerably as to length, ranging from several inches to several feet and are most generally found in the web portion of the rail. In appearance these cracks resemble very much a broken seam, but the first cause of a crack is different from that of a genuine seam.

In the cogging down of ingots, the draught in many instances is too severe for the condition of the metal which may not have been thoroughly heated. The steel does not yield to the reduction and the ingot breaks or rather the structure is torn on the surface in a number of places. The rolling is continued, the torn surface is not only being gradually closed, but is also being elongated.

It is with much difficulty that any traces of this defect may be seen in the finished rail, not only because the torn surface in the ingot has been completely closed, but because of the new scale which is formed. Let it be noted that the crack in the in-



Fig. 1.—Surface Condition of a Slab Which Has Been Thoroughly Pickled in a 20 Per Cent Solution of Sulphuric Acid. The normal scale has been removed, but the black spots are embedded slag inclusions

within the gas cells becomes firmly embedded in the metal. It is impossible to eliminate these slag inclusions by further reheating and working the metal. By pickling in any of the acid solutions, the normal scale may be removed, but the embedded slag will not free itself from the metal and hence the only way to remove these slag inclusions is by thorough chipping.

Low carbon chrome-nickel steel is very susceptible to slag inclusions; not only because of the

got may have a depth of several inches in from the surface. A surface defect having the depth such as cracked ingots generally show cannot be eliminated by continued rolling, neither does the structure weld together again by subsequent reheating and rolling since the carbon content in the rails, as manufactured to-day, is so high that very little free ferrite is present, ferrite being the microconstituent bestowing on steel welding qualities.

The conclusion is as follows: A cracked ingot must of necessity make a cracked rail and a cracked

\*Consulting metallurgist, Steelton, Pa.

rail in service is a serious matter since sooner or later the defect will progress to complete rupture because of the alternating stresses to which it is subjected.

#### Defects Due to Shearing Billets

There is one other important mechanical defect in finished rolled steel. The term pipe in steel is familiar and is recognized as a metallurgical defect; but finished steel may have a defect resembling a true pipe which may be classed as a mechanical defect since the first cause of a manufactured pipe in steel is traced back to the shearing of the billets.

In the shearing of billets and slabs, preferably 4 x 4 in. and larger, it frequently occurs that the sheared end shows a pull-out condition. There are a number of things responsible for this pull-out con-

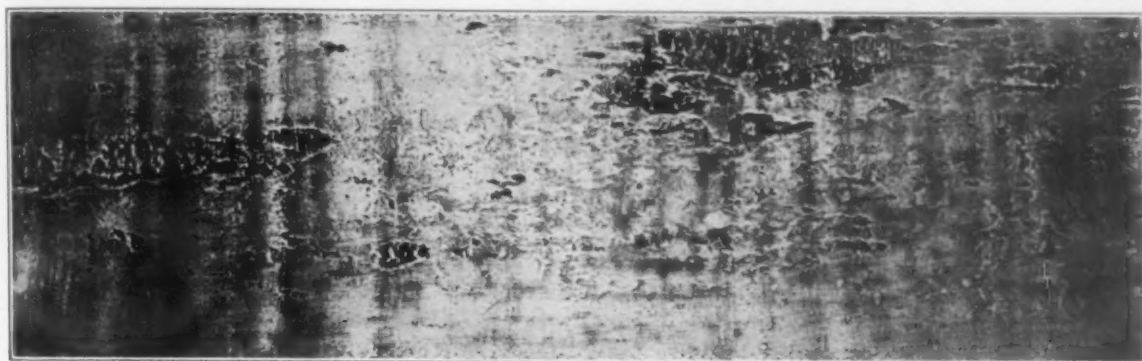


Fig. 2—Appearance of a Cold-Rolled Plate, the Dark Portions Being Due to Embedded Slag Which Did Not Free Itself from the Slab from Which It Was Rolled

dition on the sheared ends. In the first place highly segregated steel does not shear uniformly and oftentimes results in a pull-out condition. In the second place a steel with a spongy center will show this pull-out condition and in the third place, the temperature at which the billets are sheared plays a very important part.

These pull-outs on the sheared end may have a depth of more than  $\frac{1}{2}$  in. It is readily seen what happens when such billets are reheated and rolled into small sizes. The pull-out is closing up and elongating with the rolling. When rolled into a small rod or any other smaller shape, the effect of this pull-out condition extends far back into the finished material. Very often this pull-out condition or manufactured pipe is mistaken for a genuine metallurgical pipe, since in most cases this pull-out condition, producing a manufactured pipe, is centrally located. The injurious effect of a manufactured pipe on the physical properties of steel is similar to that of a metallurgical pipe.

It is to be hoped that the consumer as well as the producer of steel will have been interested in this review of the several mechanical defects which are a common annoyance to both concerned.

Discussing the metric system, the espousal of which is being urged in Great Britain, *Engineering* of London states that since 1840 thirty-four countries have abandoned their original standards and have adopted the metric, while not one country has adopted the British measures, or any fancy or fresh standard, and no country has abandoned the metre and gone back to its old units. On the other hand, it is pointed out that any British dimension can be expressed in millimetres with an error not exceeding  $\frac{1}{50}$  in. and with an average error not exceeding  $\frac{1}{100}$  in. Though we talk glibly of thousandths, it soon became evident, when the first manufacturing engineers began to make shells, that very many of them were quite unable to work it with anything like such a degree of accuracy.

#### Capital and Labor Co-operation in England

What is known as the National Alliance of Employers and Employed has been organized in England. An object as expressed in the constitution adopted at a meeting held at 64 Victoria Street, London, S. W., on May 22, is "to secure the active co-operation of employers and employed in the discussion and treatment of questions affecting labor and employment, with the special object of securing that these should be dealt with before they have reached the stage of acute controversy." A resolution was passed urging the government to abstain in future from action affecting the conditions of manufacture and employment until the joint advice of employers and employed has been obtained, and from interference in industrial disputes until every form of direct negotiation has been exhausted.

Besides labor representatives the following were among those present: Sir K. Crossley, Crossley Brothers, Ltd.; Sir V. Caillard, Vickers, Ltd.; Sir A.

Firth, Firth & Sons, Ltd.; F. Gilbertson, Pontardawe Steel, Tinplate & Galvanizing Works, and Sir Robert Hadfield, Hadfields, Ltd.

#### Set Screw with Removable Point

A set screw which is adapted for taking the place of a locking key and groove in securing pulleys, gears, connecting collars, etc., upon a shaft has been patented by Aurelio Tanzi, general machinist, 430 East Eleventh Street, New York. The screw consists of two members, the screw proper and a removable point which has a circular cutting edge. The former is divided into three sections by slots extending practically the entire length. The removable point section is placed in the hole in the collar or pulley which it is desired to fasten to the shaft, and the screw is inserted. The sides of the hole in the collar are threaded and the insertion of a wrench into the hole in the point section forces the cutting edge of the point into the shaft and also serves to bring the sections of the screw into a wedging engagement with the threads in the side of the hole.

The magnetic and allied properties of alloys of iron and other metals have been investigated recently by the engineering experiment station of the University of Illinois and the results have been presented in detail in Bulletin No. 95. In 1915 experiments with iron-silicon alloys (*THE IRON AGE*, Feb. 17, 1916) disclosed some remarkable properties which make it superior to any other material for use in certain electromagnetic machinery. These experiments were followed by others dealing with iron-aluminum alloys melted in vacuo, which have shown that aluminum, like silicon, greatly improves the magnetic properties of the metal, and also that aluminum imparts to the metal a greater toughness than silicon. The investigations were conducted by T. D. Yensen and W. A. Gatward.

An ordinance similar to the anti-picketing ordinance adopted last fall by San Francisco was carried in an election by Portland, Ore., on June 4.



# Export and Domestic Transportation Control

## Operation of the Export License System—Preferential Shipments at Home Under the Direction of the President

WASHINGTON, June 26.—Secretary of Commerce Redfield held a conference on June 20 with the secretaries of State, War and Navy and with Dr. E. E. Pratt, Chief of the Bureau of Foreign and Domestic Commerce, concerning the organization and functions of the new Board of Export Control, and subsequently issued a formal statement outlining the methods to be pursued. This statement is in part as follows:

### Exports Under License

"The representative of the Department of State will be the chairman and responsible head of the exports council, and through him the Secretary of State will approve or disapprove measures under consideration. The Secretary of State, with the approval of the President acting through his representative on the exports council, will initiate matters and otherwise control the policies which are to be determined by the exports council.

"The administrative work will be placed with the Department of Commerce, and a special division, to be known as the division of export licenses, will be established at once. The chief of this division will be assistant secretary of the exports council, and in direct charge of the administrative machinery in issuing export licenses.

"Export licenses will be issued by the Secretary of Commerce in accordance with the principles and policies laid down by the exports council. Among the matters of policies which will be determined by the exports council are the recommendation of proclamations with reference to the control of export for the signature of the President; the apportionment of rations, both by articles and countries; methods of selecting consignees for various controlled exports; methods of selecting consignors for controlled exports; matters of policy affecting the exporting of coal and bunkers. All matters of more than routine importance will be passed on by the exports council. This will require a considerable amount of work, and the council will be in session each day.

"The administrative work will be performed by the Division of Export Licenses of the Bureau of Foreign and Domestic Commerce. There will be a number of sections created, such as registry, correspondence, war-trade intelligence, issuing, accounting, filing, trade experts, and others for certain miscellaneous work. These trade experts will be required in addition to those who represent the various departments on the exports council, for the purpose of advising the exports council as to facts regarding each line of goods under consideration. It is expected that these trade experts will have the advice and co-operation of practical business men, usually through existing business organizations.

"A special war-trade statistical section will be created in the Bureau of Foreign and Domestic Commerce, for the purpose of making such statistical investigations and collating such statistical facts as may be required for the use of the exports council.

"The procedure of issuing an export license will be about as follows: The President's proclamation will designate the particular articles or class of articles under the control and the countries to which such controlled articles may be exported under license. The quantity of the particular commodity to be exported under license will be determined by the exports council, and upon the advice of the departments concerned and with such facts as may be presented by the trade expert dealing with that particular commodity. After the amount has been determined, the Division of Export Licenses will then restrict the amount licensed to the amount determined upon by the exports council.

"Applications will be made to the Division of Export Licenses. It will first be passed upon as to quantity, and the character of the consignee will next be investigated. If the amount to be exported does not exceed the quantity laid down by the exports council and the consignee is satisfactory, the license will then be issued. It is expected that the entire time of issuing a license will not exceed three days."

The Board of Export Control intends to utilize the various branch offices of the Bureau of Foreign and Domestic Commerce located in Boston, New York, Chicago, Seattle, San Francisco, St. Louis and New Orleans to facilitate its work, thus permitting exporters to file their applications for licenses at the nearest branch office. The agent in charge will telegraph the application to Washington and receive a decision by wire and will then be authorized to issue an export license in accordance with the regulations. To expedite the work of the board a staff of 250 employees will be selected and every effort will be made to provide for the issuing of licenses as expeditiously as possible.

### To Expedite Shipment of War Commodities

As the result of an important concession made to the opponents in the Senate of the administration's bill authorizing the President to direct shipments in interstate commerce and give priority to certain commodities in his discretion, the Newlands bill, S. 2356, has been passed by the Senate and is now before the House Committee on Interstate and Foreign Commerce for concurrence in the amendment. Section 2 of the Newlands bill in its original form provided that "during the continuance of the war in which the United States is now engaged the President is authorized, whenever in his judgment such action is necessary to the public security and defense, to direct that certain kinds of traffic or particular shipments, as may be determined by him, shall have preference or priority in transportation by any common carriers of railroad or water, under such arrangements, rules and regulations as he may prescribe." This provision was sharply criticised as conferring upon the President powers so broad as to supersede the Interstate Commerce Commission, powers which far exceed the military necessities of the present situation. The critics of the bill insisted that the scope of the measure should be narrowed to include only such control of commerce as the exigencies of the war should render essential, and finally, after much discussion, the Senate, on motion of Senator Nelson of Minnesota adopted the following substitute for the language above quoted:

That during the continuance of the war in which the United States is now engaged the President is authorized, if he finds it necessary for the successful prosecution of the war to direct that such traffic or such shipments of commodities as may be essential to the prosecution of the war shall have preference or priority in transportation by any common carrier by railroad or water, under such rules and regulations as he may prescribe.

It is believed that the House Committee will accept the Senate amendment and that the bill will be reported and passed at an early date.

### Use of Enemy Patents in War Time

The House Committee on Interstate and Foreign Commerce has made a favorable report upon the bill "to define trading with the enemy." The general terms of this measure have been heretofore described but a new provision has been added dealing with patents and trademarks belonging to alien enemies. In the report

upon the measure the committee describes this important feature of the bill as follows:

"Any citizen or corporation of the United States may obtain a license from the Federal Trade Commission to exercise the rights covered by any patent owned by an enemy or alien enemy. The license may be exclusive or nonexclusive, as the commission deems for the public welfare, the applicant's ability and good faith to exercise the privileges of the license being established. The Federal Trade Commission is fully authorized to prescribe the regulations (but not the fee, which is fixed by the act) under which the license may be obtained and the conditions under which it may be operated.

"The licensee shall file annually with the Federal Trade Commission, or oftener if the commission so prescribes, a full statement of the extent of the use and enjoyment of the patent rights acquired under the license, and shall pay to the custodian, or such other officer as the President may direct, 5 per cent upon the gross sales of such inventions, or 5 per cent of the value of the use of such inventions to the licensee, as may be determined by the Federal Trade Commission, and the sums so paid shall be covered into the Treasury as a trust fund for such licensee or patentee, and paid therefrom as provided.

"The enemy patentee may within a year after the end of the war file a bill in equity against the licensee in the United States district court for the district in which the licensee resides, if a corporation, in which it has its principal place of business, for the recovery from the licensee for all use and enjoyment of the patented invention. The Treasurer of the United States is to be a party to this suit, as is also the alien property custodian, upon whom notice shall be filed within 30 days after the entry of the suit. The amount recovered under the decree, when final, shall be paid on order of the court to the patentee from the 5 per cent fund deposited by the licensee, or so far as such deposit will satisfy the decree, and should there be any balance of said deposit, same shall be repaid to the licensee. If no suit is brought within one year after the end of the war, or no notice is filed as required, then the licensee shall make no further deposits, and all funds theretofore deposited by him shall be repaid to him.

"If suit is brought as above provided, the court may at any time terminate the license, and restrain the licensee from infringement thereafter, or in case the licensee, prior to the suit, shall have made investment of capital based on the license, may continue the license upon such terms and upon such royalties as the court may determine to be just and reasonable."

A similar measure is pending in the Senate and is included in the administration's program of war legislation for enactment at the present session.

#### To Pool Coal for Seaboard

The subcommittee on coal production of the Advisory Commission of the Council of National Defense is advised that, under an agreement reached during the past week by shippers, all bituminous coal will be pooled during the war at New York, Philadelphia, Baltimore and Hampton Roads to reduce the number of cars used and to expedite deliveries. Chairman Fairfax Harrison, of the Railroad War Board, estimates that this will enable the roads to haul to the ports named about 20 per cent more coal than they did last year.

W. L. C.

#### Dayton Company Sold

The Dayton Coal & Iron Co. of Dayton, Tenn., has been purchased by Harry S. Mathews, Rome, Ga., president Mathews Iron & Mining Co. The price, \$400,000, was agreed to by all the creditors and other interests. Mr. Mathews announced that he would spend \$100,000 in improving the property and have the plant in operation as soon as possible. The company has two stacks at Dayton, Tenn., last in operation in 1913.

E. A. Schwarzenberg, Cleveland, dealer in scrap, has moved his offices from the Leader News Building to suite 428 Guardian Building.

#### To Secure Interchangeable Motor Truck Parts

To co-ordinate the production of the various units which are to be installed in the Government military trucks, a three-day conference of truck, engine, transmission, axle, frame, radiator, fan and bearing manufacturers was recently held at Washington under the auspices of the Society of Automotive Engineers. Interchangeability of these truck elements so far as possible was sought rather than full standardization, and it is not intended to recommend changes in the Government specifications in any major respect. Several of the transmission manufacturers believe that their products could be completely standardized, and one of the interesting developments was a general expression of opinion that the length and width of military truck leaf springs could be standardized. Next to tires, it is stated, springs on military trucks require replacement more frequently than anything else, and an attempt to standardize them has never been attempted or seriously proposed before. In general, the truck units will be co-ordinated as far as possible without delaying prompt general production, and it is planned to supply the Government with as many trucks of a suitable type as are needed.

#### Shipbuilders Organize

The Northwest Wooden Shipbuilders' Association, with head offices in Seattle, and composed of the prominent shipbuilding companies of the State, has been formed under a temporary organization. A permanent organization will be formed at an early meeting. L. H. Griffith, temporary chairman, states that the object of the association is to form an organization to co-ordinate all resources, including the mills for producing timber, iron industry for producing machinery, and the necessary men and locations for assembling the completed vessel. The following companies are included, and additional concerns will be added later: Meacham & Babcock Shipbuilding Co., Pacific Shipbuilding Co., Anderson Shipbuilding Corporation, International Shipbuilders, Wright Shipyard, Western Shipbuilding Corporation, Anacortes Shipbuilding Co., Allied Shipbuilders, Varney Shipbuilding Corporation, and the J. B. Sweat Shipbuilding Co.

#### Effect of Caustic Soda on Boiler Steel

In certain districts where feed water for boilers contains sodium hydroxide, many boiler troubles have appeared which have given no little concern to boiler users and makers. Such water is found in the central eastern part of Illinois, in the Fox River Valley in the northern part of the same State, and in portions of other States. The engineering experiment station of the University of Illinois has just completed an investigation of this source of boiler distress, and the results are published in Bulletin 94, by S. W. Parr. It was noted that boilers using feed water containing sodium hydroxide often developed fine cracks radiating from rivet holes or extending from hole to hole. The experiments showed that the effect upon the metal is to cause brittleness, which makes it less capable of withstanding steam pressure and temperature changes. Among the remedies suggested is the addition of a salt having properties which cause it to react with the alkali and yield a harmless product.

A gas producer, with an improved method of operation, has been patented by George H. Benjamin, New York (U. S. 1,225,396—May 8, 1917), which is claimed to have the following advantages: Free evolution of carbonic acid, the maintenance of a clean furnace bosh, the production of a valuable slag fertilizer, and a lessened cost of operation. A zone of high temperature is created in the body of coal by the action of highly heated waste furnace gases and air, causing the evolution of CO<sub>2</sub>, which is then subjected to the high temperature effects of an electric current between electrodes so disposed as to use the coal as a resistance medium whereby the CO<sub>2</sub> is disassociated and combined with carbon to form CO.

# Machinable Castings from Permanent Molds\*

Modification of the Iron so That Chilling Property Is Reduced at Plant of William Sellers & Co.—How Iron Molds Are Preserved

BY ALEXANDER E. OUTERBRIDGE, JR.

THE importance of having some simple, cheap and reliable method of changing the physical properties of molten iron after it has been tapped from the cupola has been regarded as a desideratum ever since the value of the method of modifying the chilling property of carwheel iron in individual ladles, by treatment with powdered ferromanganese became well known. A great many experiments were made by me in 1880-4 with aluminum (then costing \$8 per lb.), spiegeleisen and 80 per cent ferromanganese, granulated or powdered, added in small quantity to the metal in the ladles.

The effects produced by aluminum and spiegeleisen were in the right direction, though they were not sufficiently marked to be valuable, but it was then found that when powdered 80 per cent ferromanganese was added in the proportion of one pound to 600 pounds of iron in a ladle, a most remarkable change was immediately produced in the character of the molten iron in the ladle. The first publication of these experiments was given in the address already alluded to, printed in the *Journal of the Franklin Institute*, March, 1888, and was as follows:

A remarkable effect is produced upon the character of hard iron (i.e., high chilling iron) by adding to the molten metal, a moment before pouring it into a mold, a very small quantity of powdered 80 per cent ferromanganese, about one pound in 600 pounds of iron. The result of several hundred carefully conducted experiments which I have made, enables me to say that the transverse strength of the metal is increased from 30 to 40 per cent, the shrinkage is decreased from 20 to 30 per cent and the depth of the chill is decreased about 25 per cent, while one-half of the combined carbon is changed into free carbon.

Prior to this time, manganese had always been regarded as a hardening element in cast iron, and the surprising claim that, when added in a ladle of high chilling car wheel iron it had an opposite effect, at first met with incredulity, but in course of time its use became almost universal and I believe it still is used very largely indeed in the manufacture of chilled cast-iron car wheels. No applications for patent rights were made. This led indeed to the improper use of ferromanganese in ladles of foundry iron through ignorance of its proper functions.

As long ago as 1880 I made efforts in the same direction with alloys of iron and silicon, but, at that time, the richest alloy obtainable contained less than 20 per cent silicon. Later 50 per cent ferrosilicon was produced in electric furnaces for use in steel making, and these tests were then renewed with the results that have been already published, showing that the addition of a small quantity of the powdered 50 per cent ferrosilicon alloy in a ladle of molten foundry iron produces a remarkable effect upon it, by *softening* and at the same time *strengthening* the iron. This is quite an opposite effect to that produced by increasing silicon in the cupola, which always tends to weaken iron.

Here we have, I think, a practical solution of one great difficulty that has heretofore militated against the successful use of permanent iron molds for making castings that must be machined. A mere "skin chill" not thicker than a piece of tissue paper makes the surface of a casting too hard to machine, but by this simple process the foundry foreman can eliminate the last trace of chill from his metal before pouring it into an iron mold.

For years past more or less encouraging efforts have been made and described in technical journals

of methods for making castings in permanent iron molds. The most ambitious one, perhaps, was the pipe casting process of Mr. Custer at Tacony, Pa., a few years ago, for which he obtained several patents. Mr. Custer ingeniously overcame the trouble from skin chill on his castings by turning them out of the molds before the molecules had taken a final set and the intense heat in the body of the casting helped to anneal out any skin chill that might have formed. Mr. Custer failed, unfortunately, to take into due consideration the fact that gray cast iron, of which his molds were made, "grows" or increases in cubical dimensions when repeatedly heated above a certain point and then cooled. This, I am informed, caused such a rapid deterioration of his casting machines that his process proved a failure and has been discontinued.

It will, no doubt, be a great surprise to learn that ever since 1888, machinable castings have been made in the foundry of Wm. Sellers & Co., Inc., Philadelphia, in permanent iron molds and still are being so made. I am, through the courtesy of the president of that company, now permitted to show you photographs of original iron molds, still in use, together with some machinable castings that were made in them years ago, as well as large and small molds of more recent manufacture. In fact, more than 100 permanent iron molds, ranging in weight from a few pounds up to 7000 pounds each, are to be found in use in this foundry.

The main object of casting in iron molds is to secure machinable castings of exceedingly fine grain, free from dirt, sponginess or other defects, while at the same time having marked increase in strength.

The question of relative cost of castings made in permanent iron molds (eliminating the molder entirely) as compared with similar castings made in green sand, or in baked sand molds, depends upon the number of machinable castings required to be made from one pattern as well as upon other conditions. An all-iron mold made in 1903 for a saddle for 36-in. planing machine is shown in Fig. 1. This was a difficult casting to obtain free from surface defects on one or the other face, or from draw holes, when made in sand, but when cast in this iron mold it was perfect, and all the saddles subsequently made, until a change was made in design, were cast in this iron mold.

This mold was made 15 years after my first iron mold for machinable castings was made and used in the foundry of Wm. Sellers & Co., and 23 years after the first iron mold was made by me for casting "over-iron" in another foundry, and thereby hangs an amusing tale.

In the year 1880 I suggested to the foreman of the carwheel foundry of A. Whitney & Sons, Philadelphia, with which I had become connected as metallurgist, the idea of casting all the "over-iron" in iron molds instead of in open sand molds, thus giving more room on the foundry floor and avoiding expense of making up a sand pig bed daily.

The foreman exclaimed in alarm, "Why it will be all white iron, and when we remelt it with the wheel mixture the next day the wheels will all be too hard. We do use a little white iron sometimes to bring up the chill when the mixture is running down in chill, but this plan would spoil all our calculations."

Nothing but an actual demonstration would convince the man of his error. Iron pig molds were then ordered to be made and a ton of regular wheel iron cast therein. This iron was, of course, white. On the next day the ton of white iron was remelted in a small cupola without any admixture and cast into test

\*From an address delivered before the Philadelphia Foundrymen's Association, June 6, 1917. The author is metallurgist, William Sellers & Co., Philadelphia.



bars, chill test pieces and two test wheels. On the following day, when all of these were broken, instead of being white iron, as the foreman had predicted, there was no appreciable difference found between the castings made from iron that had been chilled white

in the iron molds and similar castings made from the same iron cast in sand molds. The result was that no sand pig bed was ever again made in that foundry as long as the works continued in existence.

On coming to the establishment of Wm. Sellers &



**VARIOUS permanent iron molds used at the foundry of William Sellers & Co., Philadelphia, for making iron castings.**

In the upper row, from left to right, the first illustration is an iron mold for the spindle of a radial drill, the mold being 40 in. long, 16 in. wide and 12½ in. thick, the casting being poured from the bottom. The next is an iron mold for a saddle for a 36-in. planing machine and casting made from this mold. The mold was made in 1903. This casting was a difficult one to make in sand so as to get clean surfaces on both sides and free from draw holes. The other illustration is an iron mold for a spindle for a horizontal drill. The mold is 5 ft. long, 21½ in. wide and 18 in. thick.

In the second row the first illustration to the left is an iron mold for a bushing for a 42-in. carwheel lathe. The mold is 6½ in. thick and has a collapsible iron core. The metal must be absolutely free from chill since the thin casting, 1 in. thick, is machined inside and out. The next illustration is an iron mold for a flanged bushing 15½ in. in diameter for a 72 in. boring mill. The other illustration is an iron mold with a collapsible central portion for a gear ring for a 42-in. carwheel lathe. Semi-steel is poured in these molds and over 100 rings have been cast in this one.

In the third row the illustration at the left is an iron mold for friction disks for a dynamometer for the Pennsylvania Railroad 42 in. diameter, cast 1½ in. thick and finished all over 7½ in. thick. Cast in this mold the disks were perfect, those from sand molds having been unsatisfactory. The next illustration is an iron mold for casting long core rods in use since about 1890 and so designed that it never warps. Many thousand castings have been made in this mold. The other illustration is an iron mold and an iron core for a spiral pinion for a 36-in. planing machine.

The first illustration in the fourth row at the left is an iron mold 42 in. long, 28 in. wide for a spiral pinion for a 174-in. planing machine. It has a solid iron core. The next illustration is an iron mold for taking care of the "over-pig" metal. The molds were first made in 1880, and this mold has been in constant daily use for many years. The other illustration is an iron mold of waffle iron design mounted on trunnions for casting gaggers, in use since about 1890. Thousands of gaggers have been cast in this mold so designed that it never warps. All bearing surfaces of the lathe shown at the bottom were cast against heavy iron blocks or core inserted in the mold.

Co., Inc., in March, 1888, I found the same conditions and immediately substituted iron pig molds, which have been used daily ever since that time. These iron molds, for over-iron, anticipated the machine-cast pig-iron process now so generally used by many years, and naturally led to the next step, namely, making permanent iron molds for castings, as soon as it was found practicable to prevent iron poured in them from being too hard to readily machine. A number of iron molds which have been made and used in the foundry for making machinable castings are shown in the illustrations.

Anticipating the question: "How do you prevent these molds from warping or growing so as to become useless?"—there are two distinct methods. The simplest method and the one we adopt is to make but one casting from one melt in one iron mold. In this way the mold never gets red hot so that it does not grow. The second method is to use low silicon iron for the molds, as metal of that character grows far less when repeatedly heated and cooled above a cherry red than does soft foundry iron. Finally I may say that castings made of white iron do not expand permanently when heated and cooled sufficiently to overcome the original shrinkage of the metal, so that when practicable permanent iron molds may be made of white iron.

## MANY VALUABLE PAPERS

### Fine Technical Program for Foundrymen's Meeting—Large Number of Exhibitors

The tentative program of the technical sessions of the convention of the American Foundrymen's Association, to be held in Boston Sept. 28 to 29, contains 44 papers, and shows that the technical features of this meeting will not be neglected. The Boston meeting will be opened Tuesday morning, Sept. 25, in place of Monday afternoon, as at Cleveland last year, and morning sessions only will be held, closing Friday, Sept. 28. Simultaneous sessions for the consideration of papers on gray iron, steel and malleable iron will be necessary to dispose of the lengthy program that has been prepared. Registration will open at the Copley-Plaza Monday morning, but Tuesday the headquarters will be transferred to Mechanics' building, where they will be continued throughout the remainder of the week.

The total number of applications for space in Mechanics' building is already in excess of the number of exhibitors at Atlantic City two years ago, and the approximate floor area reserved is considerably in excess of that occupied during that show. It is probable that in number of exhibitors all records will be broken.

Manufacturers who have reserved space now are making preparations to ship their exhibits at an early date to avoid delays in delivery due to the congested condition of the railroads. As soon as delivered, all equipment will be stored in Mechanics' building until the date of the opening of the show. An added feature of the exhibit will be the display of motor trucks. Manufacturers of these vehicles have been extended an invitation by the exhibition committee of the American Foundrymen's Association to display their products, and a representative number of types undoubtedly will be displayed.

### Exhibitors Registered

The exhibitors registered are as follows:

Ajax Metal Co., Philadelphia; Albany Sand & Supply Co., Albany, N. Y.; American Foundry Equipment Co., Cleveland; American Gum Products Co., New York; American Lighting Co., Chicago; American Molding Machine Co., Terre Haute, Ind.; Arcade Mfg. Co., Freeport, Ill.; Armstrong Cork & Insulation Co., Pittsburgh; E. C. Atkins & Co., Indianapolis; Ayer & Lord Tie Co., Chicago.

B. & B. Mfg. Co., Indianapolis; Beaudry & Co., Boston; Berkshire Mfg. Co., Cleveland; Chas. H. Bealy & Co., Chicago; S. Birkenstein & Sons, Chicago; Blystone Mfg. Co., Cambridge Springs, Pa.; Brass World Publishing Co., New York; Brown Specialty Machinery Co., Chicago; Buckeye

Products Co., Cincinnati; Bullard Machine Tool Co., Bridgeport, Conn.

Cataract Refining & Mfg. Co., Buffalo, N. Y.; Frank D. Chase, Chicago; Chicago Pneumatic Tool Co., Chicago; Chisholm-Moore Mfg. Co., Cleveland; Cincinnati Pulley Machinery Co., Cincinnati; Cleveland Blow Pipe & Mfg. Co., Cleveland; Cleveland Milling Machine Co., Cleveland; Cleveland Pneumatic Tool Co., Cleveland; Thos. E. Coale Lumber Co., Philadelphia; Cutter & Wood Supply Co., Boston; Champion Foundry & Machine Co., Chicago.

Davis-Bournonville Co., Jersey City, N. J.; Debevoise-Anderson Co., New York City; Joseph Dixon Crucible Co., Jersey City, N. J.; G. Drouve Co., Bridgeport, Conn.

Federal Foundry Supply Co., Cleveland; Felt & Tarrant Mfg. Co., Chicago; Forbes & Myers, Worcester, Mass.

Gardner Machine Co., Beloit, Wis.; General Electric Co., Schenectady, N. Y.; General Fire Extinguisher Co., Providence, R. I.; Goldschmidt Thermit Co., New York; Great Western Mfg. Co., Leavenworth, Kans.

Harrison Supply Co., Boston; Herman Pneumatic Machine Co., Pittsburgh; Hill, Clarke & Co., Boston; Hoevel Mfg. Corporation, New York; Herman A. Holz, New York.

International Molding Machine Co., Chicago; THE IRON AGE, New York City.

Jennison-Wright Co., Toledo, Ohio.

T. P. Kelly & Co., New York; Julius King Optical Co., Chicago.

Lewis-Shepard Co., Boston; David Lupton's Sons Co., Philadelphia; Lynd-Farquhar Co., Boston.

McCrosky Reamer Co., Meadville, Pa.; McLain's System, Milwaukee, Wis.; MacLean Publishing Co., Toronto, Ont.; Malleable Iron Fittings Co., Brantford, Conn.; Metal Industry, New York; Michigan Smelting & Refining Co., Detroit; Midland Machine Co., Detroit; Monarch Engineering & Mfg. Co., Baltimore; Mott Sand Blast Mfg. Co., Brooklyn, N. Y.; E. H. Mumford Co., Elizabeth, N. J.; Mumford Molding Machine Co., Chicago.

National Engineering Co., Chicago; New England Coal & Coke Co., Boston; New Haven Sand Blast Co., New Haven, Conn.; Wm. H. Nicholls Co., Brooklyn, N. Y.; Norma Co. of America, New York; Norton Co., Worcester, Mass.; S. Obermayer Co., Chicago; Osborn Mfg. Co., Cleveland; Oxweld Acetylene Co., Newark, N. J.

Pangborn Corporation, Hagerstown, Md.; J. W. Paxson Co., Philadelphia; Penton Publishing Co., Cleveland; Pickands, Brown & Co., Chicago; Pittsburgh Crushed Steel Co., Pittsburgh; Portage Silica Co., Youngstown, Ohio; Henry E. Pridmore, Chicago.

Quigley Furnace Specialties Co., New York.

Railway Mechanical Engineer, Chicago; Richey, Browne & Donald, Maspeth, N. Y.; Rivett Lathe & Grinder Co., Brighton, Boston; Robeson Process Co., New York; Rogers, Brown & Co., Cincinnati.

Sand Mixing Machine Co., New York; Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.; Simonds Mfg. Co., Fitchburg, Mass.; W. W. Sly Mfg. Co., Cleveland; R. P. Smith & Sons Co., Chicago; Werner G. Smith Co., Cleveland; Standard Equipment Co., New Haven, Conn.; Strong, Kennard & Nutt Co., Cleveland; Sullivan Machinery Co., Chicago.

Thomas Iron Co., Boston; Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

United States Graphite Co., Saginaw, Mich.; U. S. Molding Machine Co., Cleveland; United States Silica Co., Chicago.

J. D. Wallace & Co., Chicago; Warner & Swasey Co., Cleveland; Wheeler & Holcomb Co., Chicago; White & Bro., Philadelphia; Whitehead Bros. Co., Providence, R. I.; Whiting Foundry Equipment Co., Harvey, Ill.; E. J. Woodison Co., Detroit.

## The Technical Program

### GENERAL TOPICS

#### Symposium on "Military Stores"

"Making Shells in Permanent Molds," by Edgar A. Custer, Philadelphia.

Paper on Military Stores, by Dr. F. C. Langenberg, Watertown Arsenal, Watertown, Mass.

"Small Steel Castings for Ordnance Purposes," by Major C. M. Wesson, Watertown Arsenal, Watertown, Mass.

#### Symposium on "Refractories"

"Refractory Materials Employed in the Metallurgical Industries," by H. C. Arnold, University of Illinois, Urbana, Ill.

"Cupola Refractories," by G. E. Jones, Whiting Foundry Equipment Co., Harvey, Ill.

"Factors Contributing to the Economical Use of Grinding Wheels in the Foundry," by Wallace T. Montague, Norton Co., Worcester, Mass.

"Results of Tests in Blending and Mixing Sand by Means of Mullers," by R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston.

"Experiences with Sand Mullers from Their Conception to

- Their Final Application to the Foundry Industry," By P. L. Simpson, National Engineering Co., Chicago.
- "Fillet-Sizes," by Frank E. Jones, University of Kansas, Lawrence, Kans.
- "Sand Blasting," by H. L. Wadsworth, Sand Mixing Machine Co., Cleveland.
- "Efficiency in the Foundry," by Jas. A. Fitzgerald, Reno, Pa.
- "The Metals of Technology," by John Ritchie, Jr., Mass. Institute of Technology, Boston.
- "Welfare Work in Southern Foundries," by J. F. Kent, American Cast Iron Pipe Co., Birmingham, Ala.
- "Co-operative Shop Training," by W. B. Hunter, Industrial Department, Fitchburg High School, Fitchburg, Mass.
- "Scientific Selection of Men," by Wm. Judson Kibby, Cleveland.
- "Co-operation," by Chicago Foundrymen's Club.
- "The Labor Situation as Relating to Co-operation Between the Employer and the Employee," by G. E. MacIlwain, Babson's Statistical Organization, Wellesley, Mass.
- "The Relationship of the Engineering Department to the Pattern Shop and Foundry," by F. J. McGrail, Struthers-Wells Co., Warren, Pa.

## GRAY IRON

- "Seasoning Gray Iron Castings," by L. M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I.
- "The Foundry from the Viewpoint of the Sales Engineer," by H. R. Atwater, Osborn Mfg. Co., Cleveland.
- "The Effect of High Sulphur in Agricultural Machinery Castings," by T. Mauland, International Harvester Co., Chicago.
- "The Use of the Microscope in the Foundry," by R. J. Anderson, Cleveland Metal Products Co., Cleveland.
- "Modern Centrifugal Cupola Blowers," by J. W. Shugg, General Electric Co., Schenectady, N. Y.
- "Making Small Cores Under Economical Conditions," by R. E. Kennedy, University of Illinois, Urbana, Ill.
- "Effect of Cupola Practice on the Quality of Iron," by G. S. Evans, Lenoir City, Tenn.
- "Briquetting Foundry Borings," by A. L. Stillman, General Briquetting Co., New York.
- "Effect of the Presence of Iron Oxide in Molding Sand," by W. R. Bean, Naugatuck Malleable Iron Works, Naugatuck, Conn.
- "Machine Made Cores," by Lewis G. Blunt, Romeo Foundry Co., Port Huron, Mich.

## MALLEABLE IRON

- "Waste Heat Boilers as Applied to the Malleable Melting Furnace," by A. W. Pratt, Babcock & Wilcox, New York.
- "The Application of Pulverized Coal to the Malleable Melting and Annealing Furnace," by Jos. Harrington, Chicago.
- "Application of Waste Heat Boilers to the Malleable Melting Furnace," by C. D. Townsend, Danville Malleable Iron Co., Danville, Ill.
- "Strength of Malleable Iron," by Prof. Enrique Touceda, Albany, N. Y.
- "Application of Pulverized Coal to the Malleable Melting Furnace," by W. R. Bean, Naugatuck Malleable Iron Works, Naugatuck, Conn.
- "Malleable Iron Annealing: Comparative Carbon Losses, Muffle vs. Por Oven," by J. B. Deisher, T. H. Symington Co., Rochester, N. Y.
- "Troubles Encountered in Machining Malleable Iron: Causes and Remedies," by A. T. Jeffery, Dayton Malleable Iron Co., Dayton, Ohio.

## STEEL

- "Molding and Casting Large Slag Pots," by C. J. McMahon, Illinois Steel Co., Chicago.
- "Recent Progress in the Application of the Electric Furnace to the Melting Problem," by C. H. Booth, Snyder Electric Furnace Co., Chicago.
- "Discussion of Electric Furnace from Central Station Standpoint, with Discussion of Power Rates and Measuring Power on a Maximum Demand Basis," by E. L. Crosby, Detroit Edison Co., Detroit.
- "Data on Treatment of Cast Iron in the Electric Furnace," by Jos. L. Dixon, John A. Crowley Co., Detroit.
- "Description of a Small Open Hearth Furnace," by David McLain, Milwaukee, Wis.
- "Welding," by M. Stuart Plumley, Davis-Bournonville Co., Boston.
- "The Use of Vanadium in Steel Castings," by J. Lloyd Uhler, Union Steel Castings Co., Pittsburgh.
- "Report of Committee on Steel Foundry Standards," by W. A. Janssen, chairman, Bettendorf Co., Davenport, Iowa.
- "Comparison of Electric Furnace and Steel Converter for the Manufacture of Small Steel Castings," by C. R. Messinger, Sluyer Steel Casting Co., Milwaukee, Wis.
- "A New System of Burning Crude Oil," by W. A. Janssen, Bettendorf Co., Davenport, Iowa.

## Progress in Pyrometry

In a discussion of "Pyrometers—Past, Present and Future" before the Steel Treating Research Club of Detroit, Richard P. Brown, president Brown Instrument Co., Philadelphia, said in part:

"The operation of the first mechanical pyrometers depended upon the difference in expansion of iron and brass. An iron tube containing a brass rod projected into a furnace, and these were mechanically connected to a multiplying movement which caused a pointer to pass around a dial. Thirty or forty years ago the Siemens copper ball water pyrometer was quite largely used. It is still used by armor-plate manufacturers, and an accuracy within about 25 deg. Fahr. is usually attained.

"Present-day pyrometers are based upon the change of resistance of a standardized conductor or the change of the electromotive force from a thermocouple with a change of temperature. The resistance thermometer is an exceedingly accurate one, but is hardly to be recommended for high temperature service. For measuring temperatures above 1000 deg. Fahr. the thermoelectric method has come to be by far the most widely used. Experience has taught that for temperatures up to 200 deg. Fahr. a thermocouple of antimony and bismuth is best. For temperatures to 1000 deg. Fahr. a satisfactory thermocouple consists of one wire of iron, the other 60 per cent nickel and 40 per cent copper. For temperatures as high as 1800 deg. Fahr. one wire of 90 per cent nickel and 10 per cent chromium, the other wire 98 per cent nickel and 2 per cent aluminum, gives very satisfactory results. Either a millivoltmeter or a potentiometer is employed to measure the voltage produced by the thermocouple, the latter method being preferable where the greatest precision is required. In modern instruments provision is made for maintaining the cold junction of the thermocouple at a constant temperature.

"The radiation pyrometer is a development of the thermoelectric pyrometer. Instead of placing the thermocouple inside the furnace where the temperature may be so high as to destroy it, it is placed in the back of a tube in front of a mirror. The rays of heat from the furnace enter the tube and strike the mirror, which brings them to a focus on the thermocouple. This instrument has a particular field for temperatures above 4800 deg. Fahr., and results with an error limit within 1 or 2 per cent are secured.

"If accurate results are to be secured from pyrometers, it is very essential that they be standardized at frequent intervals. The greatest future of pyrometry undoubtedly lies along the line of automatic temperature control, and great strides have been made in this country within the past few years in improving methods of heat treatment. Instruments which automatically control the temperature of electric furnaces have already been designed. These instruments maintain temperatures constant within 10 deg. Fahr."

## Making Coke in China

The coke ovens of the Pinghsiang collieries at An Yuan, China, are producing about 650 tons of coke per day. The ovens are of the old type, except a few supplementary ones of the so-called native type. With the latter, 63 per cent of the coal can be turned into coke, while with foreign ovens 67 per cent is produced. With modern by-product ovens it is estimated that 70 per cent of the coal could be made into coke. It takes four days to make coke in the Chinese ovens and 48 hours in the foreign ovens. From the ovens the coke is loaded into large steel cars and sent to the steel works at Hanyang. About five trains a day are sent, carrying 650 tons of coke and 1000 tons of coal.

Many protests have been made by the clergy of Germany says the London *Ironmonger*, to the requisitioning of church bells. They complain that they have been taken before they were needed. The pastors of Wurtemberg have adopted a resolution demanding that no church bells shall be taken until brewers' coppers have been requisitioned.



## TO HEAD NOVA SCOTIA STEEL

### Frank H. Crockard Goes from Tennessee Company to Canadian Operation

Frank Hearne Crockard, vice-president Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has been elected president of the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia. He will enter upon his new duties about July 1. For the past 11 years he has



FRANK H. CROCKARD

been connected with the large-scale operations involved in the development of the Tennessee company into one of the most important producers in the country. He was elected vice-president and general manager of the Tennessee Coal, Iron & Railroad Co. in 1906, when John A. Topping, chairman of the syndicate which in that year obtained control of the Republic and Tennessee companies, placed him in general charge of new construction of the latter company at Birmingham. Under that regime the new Ensley duplex open-hearth plant was built and the program included also the reconstruction of the Ensley blast furnaces and the building of a new blooming mill and rail mill. Mining developments in ore and coal were carried on at the same time on an extensive scale. On the acquisition of the Tennessee Coal, Iron & Railroad Co. by the United States Steel Corporation late in 1907, Mr. Crockard continued his work as vice-president in charge of operations. The extensions and betterments in the interval have involved expenditures exceeding \$30,000,000. In the past nine years the sociological and other betterment work of the Tennessee company has become widely known and Mr. Crockard has had much to do with this. He has been chairman of the executive committee of the Alabama Coal Operators' Association and thus has been a leader in its efforts to establish and maintain harmonious relations between operators and employees. Mr. Crockard is a member of the Alabama State Board appointed by the Naval Consulting Board, also of the American Iron and Steel Institute, the Iron and Steel Institute (London), the American Society of Civil Engineers and the American Society of Mechanical Engineers. His technical training was received at Lehigh University and the Michigan College of Mines. His first responsible position in the iron and steel industry was as blast furnace superintendent of the Riverside Department of the National Tube Co. at Wheeling, W. Va., his birthplace.

The selection of Mr. Crockard as president of the Nova Scotia Steel & Coal Co. marks a new era in that company. The action was taken at a directors' meeting in Montreal last week and was preceded by the

resignation of Thomas Cantley, who became chairman of the board of directors. For the carrying out of plans which will not be formulated until Mr. Crockard has made a full survey of the situation, the directors have decided to issue \$5,000,000 of new common stock, which will be sold at par. The issue has been underwritten by a syndicate headed by Hayden, Stone & Co., New York and Boston. On the completion in November of payments on this increase of capital stock, a stock dividend of 20 per cent will be distributed payable Nov. 20, 1917. The present capital of the company is \$7,500,000 of common stock and \$1,000,000 of 8 per cent cumulative preferred stock. The company now has a blast furnace at Sydney Mines, Nova Scotia, and a steel plant consisting of four open-hearth furnaces. There is also a by-product coke plant of 30 Bauer and 120 Bernard ovens. There are rolling mills and forging presses at New Glasgow, Nova Scotia, and the products are plates, merchant bars, forgings, angle bars, car, spring and agricultural implement steel, shafting and car axles. The company also owns the Eastern Car Co. at New Glasgow, which builds steel and wooden cars. The greatest assets are the extensive coal properties at Sydney Mines and the famous Bell Island iron ore deposits in Newfoundland, Wabana mine having facilities for producing 600,000 tons of ore a year. In addition to four square miles of underground operations there are 82½ square miles of submarine ore lands. This ore has been shipped to the United States, considerable quantities having gone to furnaces in eastern Pennsylvania. It has also been sought by German and British steel makers.

The contemplated extensions will be built at North Sydney, which is across the bay from the Dominion Iron & Steel Co.'s extensive plant at Sydney, Nova Scotia. The expectation is that blast furnaces, steel works and rolling mills will be built, and probably by-product coke ovens.

### Can Build 40,000 Automobile Trucks Quickly

WASHINGTON, June 26.—Bids were recently received at Chicago from 86 manufacturers of automobile trucks indicating that the 40,000 trucks desired by the Government can be supplied as rapidly as they are required. Manufacturers submitted bids aggregating more than 100,000 trucks to be furnished within a year, this number being nearly three times as many as have been used in the western theater of war in France by both the French and English armies. Nearly all the bidders have been engaged in building trucks for the allied governments and have a large amount of equipment which can be immediately utilized in supplying cars for the American Government. The trucks will range from one and a half to five tons, the bidders agreeing to build them either on standard models heretofore supplied to the Allies or on War Department specifications. The Quartermaster General estimates that 40,000 trucks will provide for the expeditious transportation of an army of 2,000,000 men.

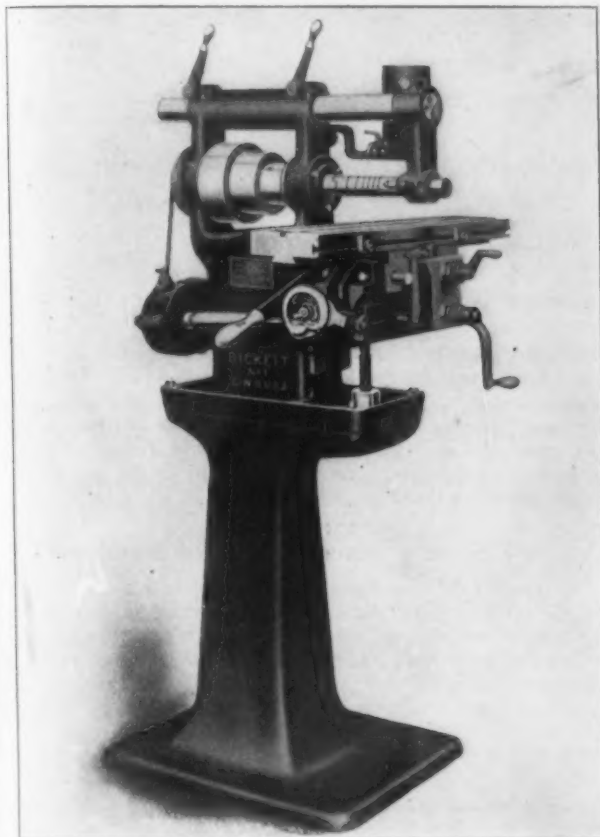
Steps have been taken by the Quartermaster's Department to ascertain whether the placing of orders for so large a number of trucks as 40,000 will in any way interfere with the building of motor vehicles for commercial purposes. Reports indicate that the requirements of the Government will engage only the facilities heretofore employed on foreign contracts and that the supply for private purposes will in no way be interrupted. Authorities in the trade have gone so far as to assert that even if the Government should need 100,000 trucks during the fiscal year beginning July 1, next, they could be supplied without invading the quota necessary to supply the private demand. W. L. C.

C. H. Cox has leased the foundry of the Pekor Iron Works, Columbus, Ga., and is operating it under the name of the Columbus Foundry Co. Mr. Cox was formerly superintendent of the Central Foundry Co.'s Holt, Ala., plant and later before going into business for himself was foundry superintendent of the Columbus Iron Works Co., Columbus.

### Bench Milling Machine with Power Feed

The Bickett Machine & Mfg. Co., Cincinnati, has recently brought out a No. 1 horizontal bench milling machine. It has a longitudinal feed of 18 in., a transverse feed of 5 in. and a vertical feed of 5 in. A reversible power feed is provided for the longitudinal movement of the table. This mechanism is geared to feed 0.003, 0.006 and 0.009 in. per revolution of the spindle and is driven by a 1-in. leather belt running on a three-step cone pulley, the power being then transmitted through a set of tumbler gears and a universal drive shaft to a worm and wormwheel under the table. An automatic adjustment relieves the worm at the end of the cut and the feed of the table is readily reversed. This power feed can be changed to hand feed at will, the latter being arranged to operate either by a geared lever or handwheel.

The screw elevating knee is of the box type and is held to the columns by a substantial adjustable gib. It is raised and lowered by an elevating screw. The arbor supporting arm is made of solid steel and is provided with a solid cast-iron arbor support bracket. This bracket is fitted with a bushed center bearing and also with a regular pointed center, either of which can be used for supporting the under arbor. The maximum distance from the face of the column to the arbor support bracket is 11½ in. The spindle is of crucible steel and is mounted in ball bearings. The front end has a No. 9 Brown & Sharpe taper for the cutter arbor and the hole through the spindle is ¾ in. in diameter. The machine is arranged for six spindle feeds and it



Longitudinal, Transverse and Vertical Feeds Are Available in a New Horizontal Bench Milling Machine, the First Being Readily Changed from Hand to Power

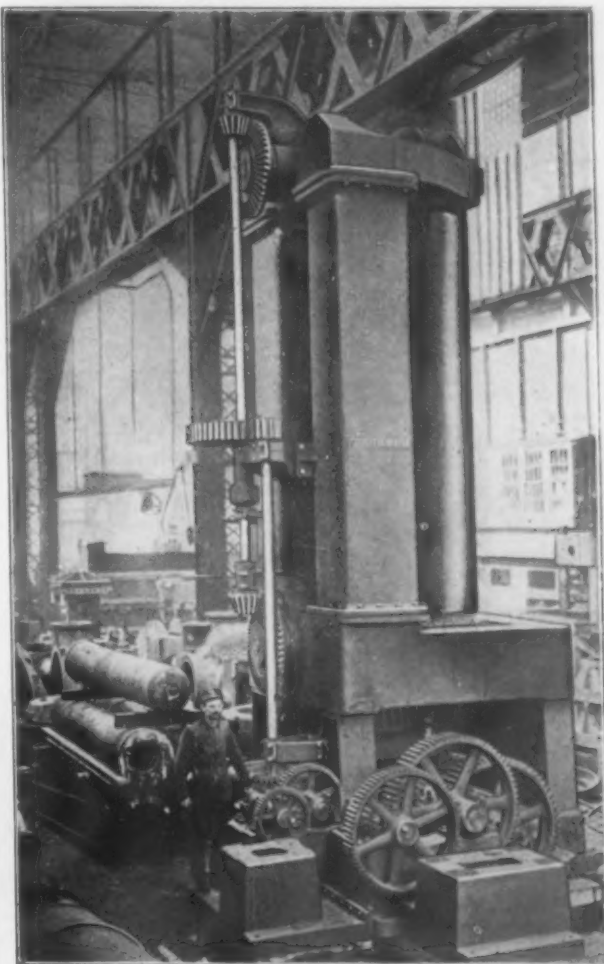
is claimed that it will safely operate continuously at 2500 r. p. m. and as high as 4000 r. p. m. has been attained.

The height of the machine without pedestal is 25 in. and the base is 9½ x 16 in. The regular equipment for the machine includes a countershaft, a 1-in. arbor, a lever for hand feed and the necessary wrenches.

The National Castings Co., Marietta, Pa., will begin operations July 2 in its new foundry for the production of gray iron and semi-steel castings.

### Vertical Bending Rolls for Boiler Plate

A bending roll for boiler plates in which the axes of the rolls are vertical instead of horizontal has been brought out by the Southwark Foundry & Machine Co.,



The Motor-Driven Screwdown of the Main Roll Can Be Operated to Throw the Roll Out of Parallel with the Other Two

Philadelphia. In addition to having the rolls in a different plane from that usually employed, it is possible to throw the main roll out of parallel with the other two.

The set consists of a main or center roll which has a diameter of 30 in. and two back rolls, each of which are 22 in. in diameter. All of the rolls are supported on a special roller bearing, and the driving motor and mechanism is located underneath the floor in a pit. This arrangement, it is pointed out, reduces the amount of floor space occupied by the machine materially. The bull pinions for driving the rolls are open-hearth steel castings, and the bearings of the main rolls are lined with bronze which can be renewed when necessary.

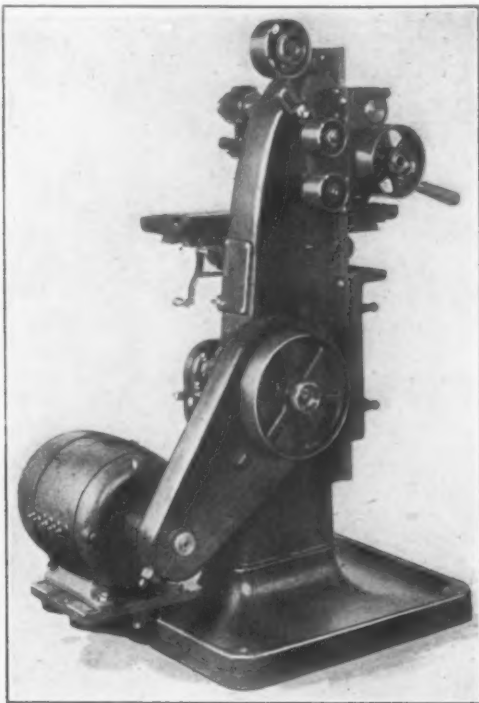
The screw down mechanism is operated by an independent motor, that for the main roll being capable of disconnection. This arrangement permits the main roll to be thrown out of parallel with the other two.

The total weight of the machine is 210,000 lb.

The Cleveland Twist Drill Co., Cleveland, announces that nine new sizes of the Ezy-Out screw extractor, which was illustrated in THE IRON AGE, Jan. 18, 1917, have been placed on the market. This makes 12 sizes in all available, which covers practically every size of set or cap screw, stud or staybolt that is ordinarily employed. The extractors are grouped in three sets, one for the toolroom and the lighter type machine shop work, another for general utility service in machine shop, garage and factory, and the third for railroad shops and yards, structural and bridge workers, and similar fields involving a heavy and broad range of work.

### Multiple Speed Hand Milling Machine

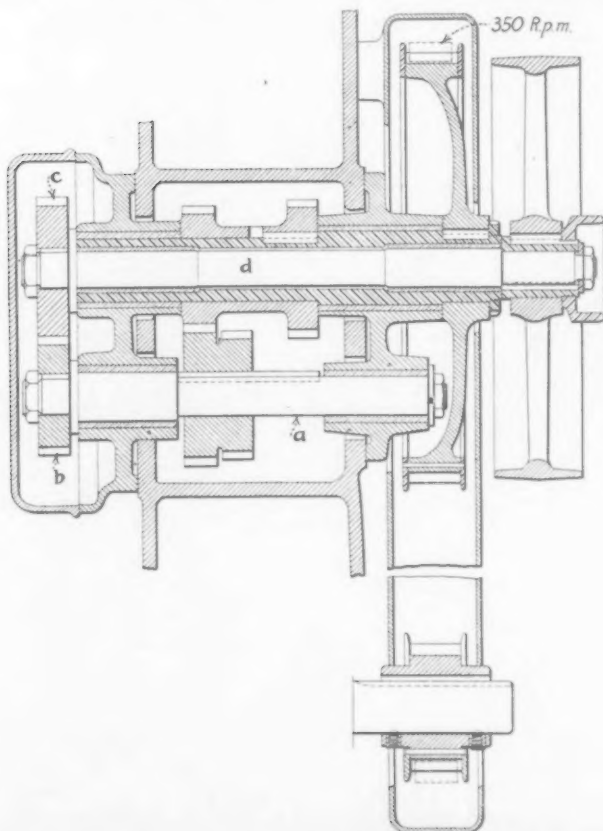
A motor driven milling machine with hand feed and an interesting arrangement for securing the various spindle speeds has been placed on the market by the



Interchanging the Three Pulleys in Connection with the Two-Speed Gearbox and the Transposing Gears Provide 12 Changes of Spindle Speeds Ranging from 150 to 1035 R.p.m.

Superior Machine & Engineering Co., 51 Fort Street, East, Detroit. The means employed to obtain this variation include a gearbox with tumbler and transposing gears and the use of interchangeable driving pulleys.

The machine, as stated, is motor driven, the power



The Gears *b* and *c* Can Be Transposed to Provide for a Variation in the Speed of the Large Pulley at the Right

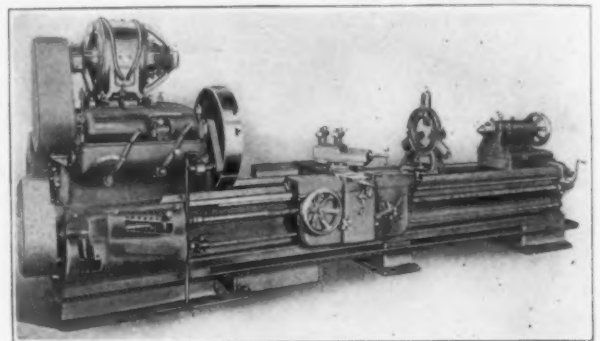
being transmitted to the gearbox through a chain and set of sprockets, all of which is entirely protected by guards. The large sprocket wheel is keyed to the hollow shaft that serves as the main driving shaft as well. The quill gear, which is also keyed to this shaft, drives the sliding gear on the shaft *a*. The gears *b* and *c* are the transposing gears, either one of which can be used on the shaft *d*. This shaft runs in bronze bearings in each end of the hollow shaft to which the large sprocket wheel is keyed. Both shafts rotate in the same direction, and the shaft *d* has the driving pulley fastened to it.

The gearbox gives four speed changes and by interchanging the lower driving pulley near the bottom of the column, the one on the end of the spindle and that on the swinging arm at the upper end of the machine, it is possible to obtain 12 speeds, ranging from approximately 150 to 1035 r.p.m.

### All-Geared Headstock 32-In. Lathe

Very heavy construction and a wide range of spindle speeds and feeds characterize a new all-geared headstock 32-in. lathe that has been brought out by the Pittsburgh Machine Tool Co., Braddock, Pa. The lathe can be supplied in practically any length of bed and a tool with a swing of 36 in. is also built.

The gearing in the headstock is of steel and the ratio is 63.5 to 1. The gears, which are of the tumbler



A Geared Headstock Provides 12 Spindle Speeds and 36 Rates of Feed for This Heavy 32-In. Lathe

type, are case-hardened, as are also the clutches. The headstock provides for 12 spindle speeds and 36 feeds or threads.

The apron is of heavy construction, in keeping with the rest of the lathe, and is of a new design. Steel gearing is used throughout and all the studs are hardened and finished by grinding.

### Iron Company Insures Lives of Employees

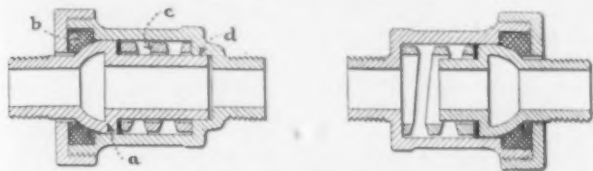
Hickman, Williams & Co., Chicago, have insured the lives of all their male employees who are eligible to insurance between the ages of 19 and 40 years, and will carry the premiums throughout the war. For the employees under 25 years, policies for \$5,000 were written, and for those over that age \$10,000, the smaller amount being the maximum which the insuring company would grant in the cases of the younger men. The policies make Hickman, Williams & Co. the beneficiary, but should an employee die, the company will turn over to his family the money that accrues from his policy. After the cessation of the war, it is hoped that the employees will continue the life of the policies, although definite arrangements in this direction have not been perfected. Like many other companies, Hickman, Williams & Co. have decided to continue the salaries of any of its men who enlist, for a period to be determined by the board of directors.

The Industrial Commission of Wisconsin is about to issue its first formal report on apprenticeships, which shows that at the close of 1916, there were 1000 legally indentured apprentices in Wisconsin, and more than one-half of these were machinist apprentices. During 1916 the number of apprentices indentured was more than three times that of 1915.



### All-Metal Swing and Flexible Pipe Joint

Swing and semi-flexible pipe joints, which dispense with the use of packing and are suitable for steam, water, gas and oil, are made by the Rostern Co., People's Gas Building, Chicago. The joints, for which patents are pending, are made entirely of metal, the special fea-



Packing Has Been Entirely Dispensed With in a Line of All-Metal Swing and Flexible Pipe Joints for Steam, Water, Gas and Oil Lines

ture being a ball-shaped shoulder revolving on a ring of anti-friction metal. Both types of joints are illustrated, one being designed for straight runs, while the other is intended for connections that are not tapped true.

The standard form of joint consists of a hollow cylinder having a ball-shaped shoulder *a* revolving on an anti-friction metal bearing ring *b*. A cast metal spring *c*, together with the pressure of the steam or other liquid passing through the joint, is relied upon to hold these two surfaces in close contact, the cylinder being kept in alignment by revolving in a socket *d*. All of the parts of the joint are inclosed by the cap and the body. In the case of the oscillating joint, which can be adjusted for various differences of alignment up to 6 deg., the hollow cylinder that carries the ball-shaped shoulder *a* is shortened. If a greater oscillation than 6 deg. is required a special type of joint is supplied.

The joints have been found adaptable for connections between the platens of steam vulcanizing and wood-bending presses, on laundry, paper and pulp machinery, for flexible pipe lines in mines and quarries, for steam blowers in locomotive roundhouses, for water doors or open-hearth furnaces, etc. In connecting two steam platens it is suggested by the manufacturers that the semi-flexible joints be used on press platens to overcome irregularities in closing, and to care for holes that are tapped out of line. A series of the joints in connection with ordinary pipes and elbows will give a maximum of flexibility.

The Rostern Company reports tests in which the joints were used with steam at 350 deg. Fahr. alternating with water at 64 deg. Fahr., the changes being made rapidly and with no unfavorable results. The joints are made of bronze in sizes ranging from  $\frac{3}{8}$  to 2 in., with larger sizes in steel, iron and special metals and also with elbow ends.

### New Electric Furnace Company Formed

The Booth-Hall Co. has been formed in Chicago to conduct a business in electric furnace building and metallurgical engineering, with offices at 565 West Washington Boulevard. C. H. Booth, formerly president of the Snyder Electric Furnace Co., is president and general manager of the new company. Associated with him are W. K. Booth, who is to be metallurgist; Julius R. Hall, vice-president; W. D. Walker, sales manager, and F. J. Sheldon, secretary. All formerly held executive positions with the Snyder Electric Furnace Co.

The company has applied for patents on an electric furnace to be called the Booth-Hall electric furnace, which will be designed in three different types—one, two or three-phase as best suits individual needs. The company has closed a contract for a 4-ton, 2-phase Booth-Hall furnace, which is to be the first unit in a newly organized electric steel company.

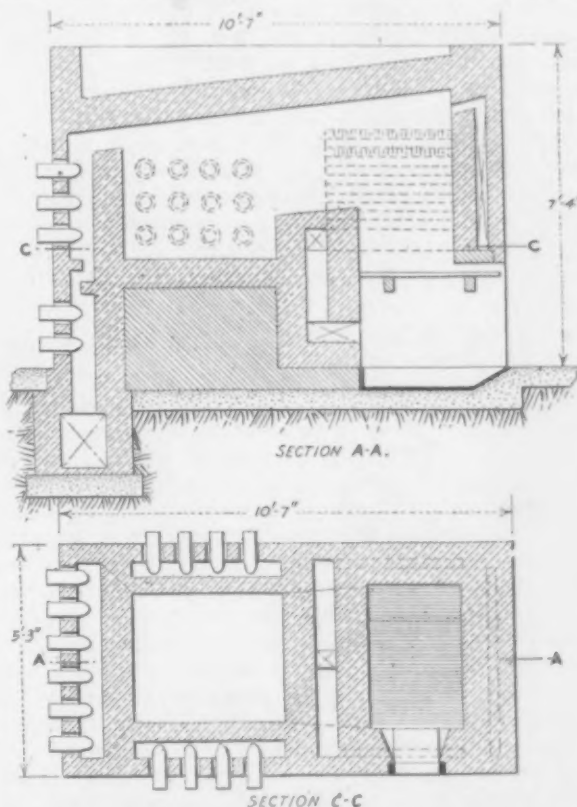
The Wisconsin Legislature has amended the State income tax law to provide for deductions from gross income of cash bonuses, a form of additional wage which has been popular among metal-working and other important manufacturing industries of Milwaukee and Wisconsin during the last year.

### Coal Furnaces for Reheating Shell Noses

A coal-fired furnace designed for reheating shell noses has been developed by S. Ogden, Stockport, England. The furnace, which is intended for use in munition factories, is designed to prevent flame coming in contact with the metal.

The side walls of the furnace, which was described recently in *Engineering*, are double with an intervening air space, the inner wall preventing the flames from coming in contact with the noses of the shells and thus overheating and cracking them. The shells are placed horizontally in apertures in the outer wall with the noses projecting into the space between the two walls, the heat which reaches this space through the inner wall being sufficient to take the chill off the shell and anneal the nose without overheating it.

After the shell has gradually had its temperature raised it is placed in a horizontal aperture in the back wall of the furnace with the nose projecting into a space between the two back walls at the left. In this position the shells come in direct contact with the flames in their passage from the furnace to the chim-



The Noses of Shells Project into the Space between the Double Side Walls and Are Heated Gradually, the Inner Wall Preventing Direct Contact with the Flame and the Annealing Is Completed by Transferring the Shells to the Back Wall where the Noses Come in Direct Contact with the Flames as They Pass to the Chimney

ney, the temperature sometimes reaching 2000 deg. Fahr. One of these furnaces is sufficient to supply two or three presses without interruption.

Walter Alexander, superintendent of motive power, Chicago, Milwaukee & St. Paul Railway Co., and general manager of the West Milwaukee locomotive and car shops, has announced a general increase in wages, which affects 1255 machinists in the machine shops at West Milwaukee. Machinists henceforth will receive 52 cents per hour, an increase of 5 cents.

The Bessemer Limestone Co., Youngstown, Ohio, will install a washing plant for purification of limestone intended for use in blast furnaces.

The National Association of Sheet Metal Contractors has chosen Milwaukee as the convention city for the 1918 annual meeting.

# Investigation of Cost of Steel Manufacture

One Inquiry by Federal Trade Commission,  
Another by the Senate Commerce Committee—A Tentative Price of \$56 for Plates

WASHINGTON, June 26.—Two comprehensive investigations of the steel industry with a view to ascertaining cost of production as a basis for prices to be paid by the Government for plates and shapes for the emergency merchant fleet and for other forms of steel for all other purposes have been undertaken as the result of the controversy between Chairman Denman of the United States Shipping Board and General Goethals, manager of the Emergency Fleet Corporation. One of these inquiries has been begun by the Federal Trade Commission at the request of Chairman Denman and Secretary of the Navy Daniels, while the other has been instituted in connection with a sweeping investigation by the Senate Committee on Interstate Commerce concerning the cost of producing coal, iron ore, copper, lead, zinc, petroleum, and other raw materials. In addition, the steel committee of the Council of National Defense, at the instance of General Goethals, has taken up the question of the price of steel shapes and plates for the emergency fleet and is expected to reach an early decision independently of either the senatorial inquiry or that undertaken by the Federal Trade Commission.

## Trade Commission Asked to Find Steel Costs

An intimation from the White House that General Goethals would be given the authority to spend the appropriation placed to the credit of the Shipping Board by the war budget bill, just signed by the President, was quickly followed by an appeal from Chairman Denman to the Federal Trade Commission to investigate the costs of steel manufacture. In a statement emanating from the Shipping Board it was said that Mr. Denman desired that "some established Government agency should arrive at costs so that the individual consumer might be protected against a rise in prices which would come when the Government went into the market for large quantities of steel at low prices." Following the receipt of Chairman Denman's request for an inquiry members of the commission conferred with Secretary Daniels at the Navy Department concerning the best method of ascertaining the production costs of iron ore, copper, coal, petroleum, cement and other raw materials as the basis for Government prices. Subsequently the Committee on Public Information gave out the following statement by Secretary Daniels:

The Trade Commission is investigating the cost of producing these articles, which information we must have before we can determine what price the Government should pay. In some cases—coal, for instance—I have fixed a tentative price, but in most cases I have ordered the supplies we need for use in the near future, subject to determination of the price later on the basis of cost of production with the addition of a reasonable profit. Beyond that figure I am not willing to pay.

There is no justification for a tremendous increase in prices of basic materials. The Almighty put these things in the ground and the only additional cost over normal times is in getting them out. Congress has appropriated so many millions for the Navy, expecting it to buy so much of these supplies. If the price is doubled it means that we will get only half as much as was expected from a given sum and will require that much more money from the Treasury.

Under the law, the President is authorized to fix a reasonable price for what is needed for the Navy. There is no disposition whatever to cause any hardship to the producers. We are perfectly willing and intend to pay them a fair, even liberal profit, but we will not pay exorbitant prices, such as are being quoted in some instances.

It is difficult, it is true, to determine the cost of production in an entire industry, because it varies so widely with different companies. One company which has a rich vein of copper can produce it for perhaps half what it costs a concern which has a poor vein. It is the same way with coal mines. These are the problems which are being worked out by the Trade Commission, which will not primarily recommend prices, but will give the cost of production as the basis for fixing the rates to be paid for supplies for the Navy. When the Commission has made its report on the cost of production a reasonable profit will be added and the price will be fixed, after full knowledge of costs, in accordance with authority conferred by Congress.

## Senate Committee's Inquiry

The senatorial investigation of the steel industry was decided upon by the Senate Committee on Interstate Commerce on June 22 at a meeting called to consider the bill, S. 2354, introduced by Senator Cummins, of Iowa, authorizing the President to fix the prices at which material of all kinds shall be sold to the railroads and other interstate common carriers, and Senate Joint Resolution 77, introduced by Senator Pomerene, of Ohio, empowering the President "to fix the price of coal and to regulate the methods of its sale, routes and transportation, and the distribution, apportionment or storage of such coal among merchants, domestic consumers, industrial consumers, common carriers and others, and of export," the President's authority to be exercised by him directly or through the agency of the Federal Trade Commission or such other agency as he may select for the period of the war and one year thereafter. The consideration of these measures developed the fact that the majority of the committee favored an inquiry of broad scope into the cost of producing the basic materials required by the Government for carrying on the war, and it was therefore decided to undertake the investigation by summoning to appear before the committee to-day Chairman Peabody of the sub-committee on coal of the Advisory Commission of the Council of National Defense. Following the adjournment of the committee, Chairman Newlands gave out the following formal statement concerning the scope of the inquiry and the plans for conducting it:

## Control of Prices the Aim

At the opening the chairman, Senator Newlands, stated that while the meeting was called primarily to consider the Cummins and Pomerene bills, he thought it important that the inquiry should also embrace the larger question of the control of the prices of the basic materials and supplies such as coal, iron, steel, copper, lead, etc. The chairman said that the abnormal conditions created by the war had disturbed the price levels which had hitherto been adjusted by competition. It had been demonstrated that competition was powerless to keep the prices of the basic materials at the normal level; that the result of the law of supply and demand had been that an enormous demand had been precipitated upon a limited supply and that thus there was no limit to which the prices might not soar. In such condition it was necessary that there should be some Governmental action covering not simply railroad material and supplies—the effect of the increase of which was to raise the rates of transportation—and not only coal, but all the basic materials which constituted the very necessities of production.

Under our Constitution, life, liberty and property were protected, and yet the country was exercising the right of conscripting its young men, fixing absolutely their compensation, and their term of service, and engaging in a service which might result in a loss of their lives. It was clear that this war power must be exercised with reference also to commodities, but it was also necessary that it should be exercised in such way as to stimulate production in order that the war demands might be met; the producers might rest

assured that no action would be taken which would injure or impair their industries but only such action as would prevent abnormal prices arising from an abnormal demand.

Senator Newlands referred to the danger of labor disputes and popular uprisings against high prices if the present condition of things continued, and urged that the public interest required that we should avoid domestic contentions over the high cost of living while we were engaged in the supreme contention abroad. Mr. Newlands suggested that as the inquiry thus far undertaken by the Agricultural Committee covered only the question of food, it would be necessary for the Interstate Commerce Committee, which had jurisdiction over transportation and trade, to enter upon an exhaustive inquiry of the whole subject, and suggested to the committee that the members of the Council of National Defense, the members of the Advisory Commission and the producers should have an early opportunity of appearing before the committee.

The committee concluded to open its inquiry upon Tuesday and gave notice that the hearings would be continuous until the subjects were disposed of. The first subject to be considered will be the question of coal.

#### Senators Tell What Steel Should Cost

While the Interstate Commerce Committee was planning its investigation several Senators were debating on the floor the merits of the Denman-Goethals dispute and giving their views as to what constitutes a fair price for steel. Senator Vardaman, of Mississippi, who has lost no opportunity to attack the steel industry, declared that "\$30 per ton for steel would bring a fair return to the stockholders of the companies manufacturing it; hence the demand of \$95 which is made upon the Government of the United States is a hold-up pure and simple and does not differ in morals from the act of a man, who, at the point of a pistol, would force the wayfarer to stand and deliver his hard-earned cash." Replying to Senator Vardaman, Senator Calder, of New York, said that he agreed that \$95 a ton was "an extraordinary price for steel," but he added that contractors buying for building operations in New York at the present time were paying as high as \$120 a ton for steel. "It is true," he said, "that \$120 a ton is an excessive price for steel, but so is 35 cents a pound for copper and \$3 a bushel for wheat, and if these prices continue no one can foretell what the future may have in store."

Continuing, Senator Calder said that the steel market has risen rapidly with a great increase in demand and in cost of production. As an illustration of the rise in the market he referred to a shipbuilder of his acquaintance having a yard in the State of Washington, and who one year ago contracted for a large quantity of steel at approximately \$35 per ton. This man now has a contract for ten cargo-carrying ships to be built for the Shipping Board on the basis of his engagement of steel made at last year's price.

#### Denman's Maximum \$56 Per Ton

President Farrell of the United States Steel Corporation on June 21 conferred with Chairman Denman of the Shipping Board with regard to the price of steel. Mr. Farrell was reticent as to what took place at the conference and Mr. Denman would only go so far as to say that he told Mr. Farrell that under no circumstances would he agree to pay more than \$56 per ton for steel and that no conclusion was arrived at. The steel makers, Mr. Denman said, were unwilling to agree to supply steel at the board's figure, and insisted that to do so would be not only to forego all profits, but to discriminate heavily against other consumers.

General Goethals held several conferences with members of the Steel Committee and with Bernard Baruch, chairman of the Committee on Raw Materials of the Advisory Commission. Mr. Baruch is seeking to avoid being drawn into the controversy and loses no opportunity to declare that what the country wants is the speedy construction of ships, both steel and wood, rather than disputes concerning price. Mr. Baruch, however, has not suggested any solution of the problem as to

how a satisfactory price can be arrived at, although he states frankly that in his opinion a single individual should be given authority to act in this and all other similar matters.

Pending the settlement of the price of steel for the emergency fleet, the Shipping Board announces that it will continue to approve contracts at the tentative price of \$56 per ton which the steel makers have agreed to accept conditionally, with the distinct understanding that they are not to be bound by this figure. Speaking for himself, however, Chairman Denman declares that he favors commandeering all the steel plants in the event that the manufacturers refuse to accept the figure to be fixed hereafter on the basis of the report of the Federal Trade Commission on cost of production. In conferring authority on General Goethals to proceed with the construction of the emergency fleet, President Wilson has not as yet transferred to him the power vested in the Chief Executive by Congress to commandeer material, plants, etc., for the purpose of building the ships and it is not believed that any steps in this direction will be taken, at least until the Trade Commission and the Senate Committee on Interstate Commerce have made their reports on the cost of production.

W. L. C.

#### No Publicity to Munitions Contracts

As the result of conferences at Washington between officials of the War Department, the General Munitions Board, the supervising officials of the Council of National Defense, and members of the Committee on Public Information, it has been formally determined not to make public hereafter any information with regard to contracts for guns, ammunition, and other ordnance supplies. Some weeks ago the officials of the ordnance bureaus of both War and Navy Departments requested the Washington correspondents of the daily newspapers, trade journals and other publications to refrain from sending their respective journals information concerning contracts for ordnance. No formal statement of the policy of the two departments was issued, however, and considerable information regarding such contracts found its way into print, the data being given out in most cases by manufacturers receiving contracts. The Bureau of Public Information on June 21 issued the following bulletin:

The War Department authorizes the following: "Because of war conditions the War Department has decided not to make public the awards of ordnance contracts. Information as to the size of contracts is withheld because of its value to the enemy, and the names of firms working on Government orders will not be given out because it is believed best not to draw attention to them."

Brig. Gen. Crozier, Chief of Ordnance, has issued the following statement: "The War Department is having no difficulty placing contracts with American firms for rifles and pistols and for rifle and pistol ammunition, and has every reason to feel confident that the contracts will be executed expeditiously and well."

It is understood that requests will be made of all manufacturers receiving ordnance contracts to treat the fact that they have obtained them and all details in connection therewith as confidential so far as any publication is concerned.

A series of evening and Saturday courses in engineering chemistry, physics, mathematics, drawing, history, economics and languages is announced by the College of Engineering of the Polytechnic Institute of Brooklyn for the season of 1917-1918. The courses are especially designed to afford men in active practice opportunities for professional study and may be taken independently or in connection with the regular work of the courses in engineering. A pamphlet describing the courses can be procured from the director, Prof. Charles A. Green, 85 Livingston Street, Brooklyn, N. Y.



ESTABLISHED 1855

# THE IRON AGE

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## Government Regulation of Prices

Predictions are becoming more and more common that it will become necessary for the Government to regulate prices in the steel industry. The proposal is glibly made, but it involves serious and far-reaching consequences. It is important to note that the suggestion refers to prices in the steel industry, not simply to prices of the steel industry, as the latter would refer only to prices steel manufacturers would charge those who lie beyond the industry proper, while the former includes also the inter-department prices, inside the industry.

It is not so long ago that the fear pervaded many quarters that if the Government purchased steel for war use at much below the market, the market would eventually recede to the level fixed on the Government portion. It was a case of fearing rather than expecting, because with advancing costs the prices might not produce profits commensurate with war time taxation and national borrowing operations. The course of the steel market since then, however, has been one of very sharp advances. Last week's quotations in THE IRON AGE were higher than those of eleven weeks earlier, when war was declared, by the following amounts per ton: Plates, \$45; beams, \$15; bars, \$15; hoops, \$35; black sheets, \$50. The billet quotation has advanced \$25.

The idea that Government price regulation in the iron and steel industry may become desirable rests upon two widely separated considerations. The one is that consumers of steel may not be able to continue their business in the manner best calculated to preserve industrial activity for the good of the country at war. The other is that coal price regulation seems certain and that controlled coke prices are almost a corollary, but if coke prices are regulated, the question comes up, why not pig iron in turn, and then the most finished products?

Thought on this subject is naturally in a very inchoate stage. The market situation is in such chaos that one is likely to grasp at ideas promising relief without following them to their necessary conclusion. The word "regulation" has an alluring sound. It is very nice to have everything regular and smoothly operating, but when the condition is analyzed it is seen at once that what is

needed is regulation of industry, of the flow of material, and regulation of prices does not accomplish that, for the very simple reason that price regulation refers to business that is still to be done, whereas the present confusion arises from the amount of business that has been done, on paper, and awaits the carrying out by actual production and shipment of material. If the flow of material due against existing obligations could be regulated the condition of the steel consuming industries could be improved, and it is possible that some improvement could be effected by confining the movement of the cruder materials, or raw materials, to the contracts that are in legal effect.

It is difficult to see how the fixing of maximum prices for this commodity or that could make the conduct of business more orderly. In the finished steel products there are no producers who are not already filled with orders requiring the product of months to execute. To fix a maximum price at which sales would be permitted might simply prevent sales being made at all, while if the producer were really willing to sell there would have to be an authority to determine to whom he should distribute the material he was willing to sell. If at the present time there were more material offered than inquired for the market would be a declining instead of an advancing one.

Regulation of the industry in the proper sense of the word, then, would be regulation of the execution of orders now on books, and regulation of the tonnages, deliveries and buyers of the material to be sold in future. That is a much larger proposition than the proponents of Government price fixing have in mind.

## Steel-Making Costs

Two investigations of the cost of producing steel have been started at Washington—one by the Federal Trade Commission, and the other, coupled with an inquiry into coal, oil, copper and other costs by the Senate Committee on Interstate Commerce. The ostensible aim in both cases is the getting of data that will show what would be a fair price for the Government to pay for steel for itself and its allies in the war. It seems to be taken for granted that if costs of production could be determined it would

be possible for a board, or commission or a Cabinet officer, or a Senate committee to say what prices for various forms of steel the manufacturers ought to charge the governments of the United States, of France, Great Britain, Russia and Italy.

The first thing to be said about these attempts to find out what it costs to make steel in the United States is that the men in charge of the investigations are not equipped to make them and that if they could discover what they think they can find they are not competent to say what amount should be added for profit, under all the conditions and in view of all the interests to be conserved in such a critical time. On the other hand nothing could more easily come from the attempt now being made than an unsettling of business at the very time when by every means business should be kept prosperous.

It should not take long for these inquiries to bring out the fact that there is a wide range in cost of product in the country's steel works and rolling mills; not only differences in local advantages, but important differences in respect to raw materials. Even among companies owning coal and ore these are considerable. The Steel Corporation's earnings in years before the war were at times \$5 a ton more than those of prominent independent companies, due in part to diversity of products of the corporation subsidiaries. In another class are steel companies which make pig iron, but buy iron ore and coal and coke. Going a further step, there are the makers of steel who buy their pig iron in the market. A fourth large class takes in rolling mills which go into the market for semi-finished steel.

The buyer of Mesaba non-Bessemer ore has seen an advance of \$2.25, or 80 per cent, in two years. The buyer of blast furnace coke has paid lately on contract \$9 and \$10, against \$2.25 less than two years ago. The buyer of pig iron has seen an advance of \$25 to \$30 in ten months. Billets have advanced \$50 since June, 1916. Labor cost has gone up 40 to 50 per cent in 18 months. On the item of ferromanganese, as against 35 cents for the amount required for a ton of steel before the war, the figure is now nearer \$4 per ton of ingots. All the customary reckonings of the various steps in the industry have been overturned.

While the reason given for these latest cost investigations is new, they are but the breaking out of a familiar propensity. The Stanley investigation is only six years back. Just preceding it was the Bureau of Corporations report on steel-making costs. It filled two stout volumes and was widely discussed in 1911, but is now on the shelves and not a reference has been made to all its detailed data in the agitation of the past two weeks. As a basis for any legislation in regulation of the industry it is practically valueless.

What is wanted in the present war crisis is not cost investigations, inconclusive and misleading, but a fair-minded approach to the adjustment of prices for Government steel. The manufacturers have been disposed to make concessions. There should be no thought of asking the extreme prices which certain steel products have reached for early delivery after mill capacity has been practically sold up for months ahead and the wants of most con-

sumers covered by contracts extending over like long periods. The basis should approximate the much lower average prices of finished steel now being delivered to manufacturing consumers on these contracts.

### Magnetic Testing of Steel

When a scientific expert positively asserts the practical import of a subject thought of only theoretically before, one is bound to weigh his statements with care. An illustration is the baffling problem of testing the quality of a material without testing to destruction, or without describing it in terms of the examination of a part not necessarily representing the state of the whole. The contribution to its solution was made this week by Dr. Charles W. Burrows, of the U. S. Bureau of Standards, before the American Society for Testing Materials. Dr. Burrows has been investigating for some time to ascertain quantitatively a relation between what may be termed the magnetic receptivity of a ferrous product and the physical properties of the material, thus to ascertain lack of homogeneity in terms of varying permeability. He now says that "the fundamental fact that there is a definite relation between the magnetic and mechanical properties of steel is so well established that the successful application of magnetic analysis to commercial testing is assured." He admits that apparatus for the particular case must be developed and operators trained, but "the difficulties presented are not excessive."

Apparently the prophetic utterances of Dr. Henry M. Howe on this subject, in his masterly address before the International Association for Testing Materials in New York in 1912, are proving true sooner than even he expected.

### The Continued Negro Migration

Of the numerous labor problems of the day some of the most serious are connected with the migration of negroes from the South. Since various phases of this movement were discussed in THE IRON AGE two months ago, new developments have not tended to bring about a change for the better. The people of the South, in dire need of negro labor to harvest crops and work in many manufacturing plants, have adopted drastic methods to keep the negroes at home. In some districts heavy licenses have been imposed on agents of railroads and other companies seeking negro labor. In Alabama, negroes have been fined and given hard labor sentences for the alleged offense of attempting to entice men to go North.

The migration leaves problems in its trail and takes others to the communities to which it moves. Not only is the South deprived of the labor of men who go to the North, but also it is compelled to care for women and children left behind. Desertion is not, of course, universal, for some men send money to their families, and others take them to the North, but there is enough of this lack of responsibility on the part of the blacks to cause much annoyance and no little outlay to the whites.

In the North, some negroes are proving good

workmen at steel plants and other places where the test is severe, but many are shiftless and constantly are moving from one town to another. That the climate of the northern States is not agreeing with many negroes is shown by the high percentage of deaths from tuberculosis, and the situation is now causing much anxiety to health departments of some States and cities.

Despite all attempts to check the migration, it continues, and it is not unusual to see an entire passenger car filled with negroes bound from the South to Pittsburgh and other industrial centers of the North. The lure of the high wages is the principal cause of the negroes leaving their southern homes, and it will continue to have a powerful influence until wages in the North and South more nearly approach equality. There is, however, little doubt that the sunny South land will continue to be the principal home of the negro. In the long run, he is happier there than anywhere else on earth, and it is highly probable that as one result of the exodus, whites and blacks of the South will come to have a better appreciation of each other, and that some conditions about which the negroes have had a right to complain will be corrected.

### Not Yet Eye to Eye

The threshing out of opposite opinions as to policies to be pursued by the Nation, by industry, by trade and by individuals has marked all the weeks of preparation for the actual carrying of the war into Europe. Washington has had an unending succession of clashes among those who are helping the Government to get ready to fight. In respect to business we have had the campaigns of the economizers on the one hand and the advocates of "business-as-usual" on the other. Both views have merits. The business-as-usual propaganda was largely to offset unwise views of economy that would have brought some of the country's business to a standstill. The advocates of economy, at the same time, have well made their point that the war is to be a more serious business than the Nation has begun to appreciate, and that the crying wastefulness in American living must be checked if the war is to be won.

Then there was the resolution of the war board that conventions should be discouraged in the interest of fuel conservation and to prevent interruption of freight traffic. On the other hand, many business bodies have declared that to forego conventions and general commercial meetings is false economy and would be harmful rather than beneficial both to the Government and to the Nation's business. It is certain that the railroads have not yet come to the point, in the handling of war traffic, where the carrying of passengers to the usual business conventions has interfered with the freight movement. It is to be said also that if business men are not to mingle to exchange views on phases of the present situation as they affect business, a great stimulus to right action in the conduct of the war will be lost.

The one thing to be avoided in the unending conflict of opinion as to ways and means is that state of mind in which the overturning of the coun-

try and the abandonment of all ordinary standards and procedure are considered the only way to meet the unprecedented emergencies of this war.

## CORRESPONDENCE

### Cast Steel Ship Sections and Riveting

*To the Editor:* With relation to the proposed cast steel ship described in THE IRON AGE of June 14 the question is asked: Why weld the sections of a cast steel ship together? Why not rivet them?

The weakest portions of a riveted ship are the joints. The rivets get loose and cause leakage. Water gets into the crevices between the edges of the plates and causes corrosion of the plates and rivets. The strains upon a ship's hull caused by the vibration of the engines and the strains due to ocean conditions search out the weakest portions of a ship's hull and there exact their toll. The edges of plates are perforated for the sake of receiving rivets, and perforations weaken the plates.

It would appear impossible to make a joint between the plates of a ship as strong as the plates themselves by riveting. Some naval architects have claimed that riveted joints are as strong as the rest of the plates. The answer to their claim is that the riveted joints are the first point of trouble. Cargoes are damaged and sometimes ruined by the leakage.

A cast ship is made of large sections of integral metal. The sections are so large as to reduce the number of joints. To illustrate this feature, a ship might be considered composed of two enormous sections joined together across the middle by a single riveted joint. The joint, being the weakest point of the ship, would have concentrated upon it most of the strain to which the ship is subjected and the deterioration of the joint would be correspondingly rapid. In fact, such a ship might be in danger of parting in the middle in a storm.

The cast steel ship will have fewer joints than a riveted ship. To rivet the edges of such large sections together would result in a correspondingly rapid deterioration in the joints, greatly reducing the efficiency of the ship. Aside from the danger of ruptured joints in heavy weather, there is more repair to be considered, together with the loss of time for docking and new castings. This means loss of time and loss of revenue.

To eliminate this defect in the cast steel ship, it is essential to form joints that are enough stronger to compensate for the loss of efficiency in the joints. This may be accomplished by electric welding provided the weld is of the proper character. The most effective weld is that which produces edges of the same strength as the rest of the steel of the ship. When the sections are welded together by such a method, the strains upon the ship's hull are no longer concentrated upon the joints between the sections, but are evenly distributed throughout the rest of the metal of the hull. Without rivets and crevices there is no corrosion in the joints.

To cast ships of small sections appears of slight advantage. Welding large sections of cast steel, therefore, appears to be a necessity for this method of ship-building.

MYRON F. HILL.

New York, June 22, 1917.

### The War Tax on Excess Profits

*To the Editor:* The attention of THE IRON AGE's readers is called to the proposed sliding scale war tax bill now being considered by the Senate Finance Committee. This arrangement will hit the foundry and iron trades very hard, because they as a rule had very low profits before the war, and would probably be exempt by not over 6 per cent under this bill; but the many automobile and kindred companies which made enormous profits before the war, and many of which in addition largely increased their capital stocks since



the war started, would probably bear no share of this taxation. It was only a few weeks ago that we heard Congress discussing the wisdom of placing a very heavy sur-tax on automobile companies. Now the Senate Finance Committee is actually considering a sliding scale tax which will practically exempt them from all tax.

In the writer's opinion, the House bill is a perfectly fair bill; it imposes a flat exemption and a flat tax rate on all alike. The proposed Senate bill is unjust. Those manufacturers who made little profit before the war are certainly entitled to try to make some now and "even matters up," but under the proposed bill the firms which made enormous profits before the war could continue to make large profits (perhaps only slightly smaller than the pre-war profits), and be practically exempt from more taxation. We are calling attention to this because it seems to have been overlooked by the press entirely.

MANUFACTURER.

## TO MOVE IRON ORE AND COKE

### Difficulties of the Lake Shipping Situation Expected to Yield

There is much discussion among the interests connected with the movement of Lake ore and coal and blast-furnace coke and limestone over recent developments in transportation. At the outset of the season, the movement of ore, while not satisfactory, was better than had been expected, and a normal amount of ore, considering the ice conditions, was brought in and delivered. The railroad operators inclined to the opinion that the ore and vessel men showed a disposition to move the ore to the exclusion of coal, but a study of the situation brought out the fact that the rather rapid movement of the ore was due to the scarcity of return coal cargoes up the Lakes. This scarcity of coal cargoes, it was found, was not due to any falling off in coal shipments from the mines, as compared with 1916, but the coal producers apparently were taking advantage of much higher prices available at inland points than are offered under the regular plan of coal contracts in the Northwest.

In Chairman Peabody's committee on coal and coal production an urgent demand developed on the part of the coke wing of the committee for cars to move Connellsville coke. Reports were made on this subject by a sub-committee of coke operators and Mr. Doyle, the commissioner of the American Pig Iron Association, which resulted in an order issued by the Commission on Car Service to add 20 per cent to the supply of cars available for Connellsville blast furnace coke. As this order becomes effective, many of the cars must be drawn from the ore trade, and it is to be expected that the ore shippers will make a protest.

This pulling and hauling of different interests on the railroad committees, while uncomfortable and at times not a little disconcerting to those entrusted with railroad operation, is expected to have the effect of spurring them up to secure the return to the Lake lines of the cars best adapted for that service. The year promises to be a trying one for the railroads and shippers, but the concentration of effort by all interested, in the direction of producing the pig iron and the steel necessary for the national defense, must have its effect as the co-operative movement continues.

W. K. Kenly has sold his interest in the Merchants Steel & Supply Co., Chicago, to E. John Hicks, vice-president, and T. A. Schwengel, secretary. Mr. Kenly has also resigned as president, treasurer and director, and has affiliated with the Interstate Iron & Steel Co. as an assistant to George F. Davie, vice-president and treasurer of the latter company.

The Philadelphia office of the Cooper Hewitt Electric Co., manufacturer of mercury vapor lamps, has been moved from 124 S. 8th Street to the Drexel Building, Philadelphia.

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### Moderate Advance Granted

PITTSBURGH, PA., June 27.—(By Wire).—At the conference last week at Atlantic City, N. J., between wage committees of the Amalgamated Association and the manufacturers of sheets and tin plate that sign the Amalgamated scale, the present scales for sheet and tinplate mills that expire on June 30 were readopted for the year starting July 1, with the exception that an advance of 28 per cent was granted to the labor that coats the black plate. However, from this advance of 28 per cent are to be deducted all advances made voluntarily by the manufacturers during the present scale year. The actual advance is 13 per cent.

## TESTING-MATERIALS MEETING

### Annual Gathering of American Society for Testing Materials at Atlantic City

ATLANTIC CITY, N. J., June 26.—The big step forward which has been taken to secure national standards through a committee made up of representatives of five national engineering societies was announced by A. A. Stevenson, vice-president Standard Steel Works Co., in his presidential address Tuesday night, before the annual meeting of the American Society for Testing Materials in session here. The governing boards of the societies have not yet had sufficient time to consider the joint committee report, but even if it has favorable consideration only in general, the result, Mr. Stevenson emphasized, will be far-reaching and the adopted specifications of, say, the proposed American Engineering Standards Committee will get a standing they would not otherwise have.

In a prophetic vein, Mr. Stevenson suggested that one of the developments of the future will be the increased testing of individual parts; that is, so-called proof testing, as distinguished from the ordinary method of representative testing, and he mentioned in this connection the contribution for a later session by Dr. Burrows, Bureau of Standards, of a paper on magnetic testing.

An unusual situation has arisen in that Brigadier General Bixby, who has re-entered the Army Service, will be president *in absentia*, and the new vice-president, Professor Orton, is engaged on Government work on the border. General Bixby wrote that he expects to attend executive committee meetings.

A feature of the Tuesday evening session was the presence of all the six past-presidents who followed the late Dr. Charles B. Dudley, and addresses were made by all. That of Captain Robert W. Hunt, which rose to high patriotic levels, touched on the attitude of officials in Washington, who seem not willing to trust the American people. "The men who have built our great interests," he said, "are Americans. The progress of the country is vital to the success of their own industries."

#### Standardizing Photomicrographic Work

One of the noteworthy contributions of the first session was the report of a new committee appointed as a result of a motion at the last annual meeting to study the question of standardizing magnifications for work with the microscope. The committee offered a tentative list of definitions and rules. These stipulate that the standardized magnifications for making micrographs of steel and ferrous materials shall be 50, 100, 250 and 500, with 100 diameters as the size for general use in the society reports and for showing grain size, and for making micrographs of non-ferrous metals the magnifications shall be 25, 75, 150 and 250, with a magnification of 75 diameters for general use in the society reports and for showing grain size of copper and copper alloys.

#### New Wrought Iron Specifications

Separate specifications for wrought-iron materials, now included in specifications for similar steel products, were advocated by the committee on wrought iron. Specifications for wrought-iron pipe were submitted, to be accepted under the present rules of the society as tentative. In this the tensile strength of the material is put at 40,000 lb. per sq. in. minimum, against 45,000 lb. in the present standard, with the yield point remaining at 24,000 lb. and the elongation at 12 per cent in 8 in. A bend test is stipulated, requiring that for sizes 2 in. and under, a sufficient length of coiling or bending pipe shall bend cold through 90 deg. around a cylindrical mandrel, the diameter of which is 15 times the nominal diameter of the pipe, without developing cracks at any portion and without opening at the weld.

A specification for staybolt iron has also been drawn up, essentially a revision of one now in existence. It

is the result of conferences with the Master Mechanics Association, which has a specification allowing a range of 47,000 to 52,000 lb. per sq. in. in tensile strength, with a secondary requirement limiting any one lot of iron to a permissible variation of only 3000 lb. per sq. in. in tensile strength, whereas the new specifications limit the tensile strength to a flat range of from 48,000 to 52,000 lb. per sq. in. The proposed Master Mechanics' specifications include requirements for manganese and phosphorus, whereas the new specifications include only a manganese requirement, to be not over 0.10 per cent.

A revision in the wrought-iron bar specification was also advocated. It seems that owing to the difficulty experienced in obtaining refined wrought-iron bars in large sizes in accordance with the present standard specification, it is to be allowed that for material over 4 sq. in. in sectional area a reduction of 500 lb. per sq. in. from the tensile strength will be permitted for each additional 2 sq. in. and a proportionate amount of reduction for fractional parts thereof. It provides, however, that the tensile strength shall not be more than 3000 lb. per sq. in. below the general minimum requirement of 48,000 lb.

A specification for wrought-iron blooms and forgings for locomotives and cars has been drawn up by a new committee of which H. E. Smith, engineer of tests, New York Central Railroad, is chairman. This provides for two classes of blooms and forgings: class A, made wholly from puddled pig iron, and class B, made from selected No. 1 wrought-iron scrap or a mixture of scrap and puddled iron. In both classes of forgings cross piling is prohibited. For class A the manganese is put at 0.07 per cent as a maximum and for class B at 0.15.

#### Cast Iron Specifications

A specification on cast-iron soil pipe and fittings was presented by the committee on cast iron, Dr. Richard Moldenke, chairman. This covers the coating of the pipes and includes a table of weights of fittings which do not appear to depart materially, if at all, in the ordinary sizes, at least, from specifications prepared by the American Society of Inspectors of Plumbing and Sanitary Engineers and the National Committee of the Confederated Supply Associations. The thickness of the barrel is put at  $\frac{1}{4}$  in. with a permissible variation of  $\frac{1}{16}$  in. under. The inside diameter of the barrel is not to vary more than  $\frac{1}{8}$  in. under the nominal size of the pipe and the outside diameter variation permitted is  $\frac{1}{8}$  in. over or under.

A specification on railroad malleable-iron castings, drawn up in co-operation with a committee of the American Foundrymen's Association was also submitted. This provides that the minimum tensile strength shall be 45,000 lb. per sq. in., elongation  $7\frac{1}{2}$  per cent in 2 in. For transverse tests a load of 2100 lb. at the center is specified with a maximum deflection of  $1\frac{1}{2}$  in.

#### Speed of Pulling Tensile Tests

Because the pulling speed in making a tension test has a marked influence on the tensile properties shown, an increase in speed increasing the values found for yield point and tensile strength, the committee on methods of testing, Prof. Gaetano Lanza, chairman, recommended that the crosshead beam of the testing machine shall be kept balanced but in no case must the speed exceed the following values: For material of 80,000 lb. tensile strength or under, 0.5 in. per min. for the yield point and 2 in. for the strength determination, with a 2-in. length under test and 2 in. and 6 in., respectively for an 8-in. length. For material of over 80,000 lb. tensile strength, 0.25 in. per min. for the yield point and 1 in. for the ultimate strength, with a 2-in. specimen and 0.50 in. and 2 in., respectively, with an 8-in. specimen.

A rig applied to a testing machine to secure a graphic record of a stress-strain diagram in such a way as to mark out clearly the proportional limit was described in a paper by Prof. H. F. Moore, University of Illinois. The observer turns a record drum a definite distance each time the pointer of the extensometer

passes a division on the extensometer dial and a series of steps is secured on the record. By tracing a line through the tips of the steps, the point of departure from strict proportionality between stress and strain may be readily ascertained. The paper, with descriptions of the apparatus and reproductions of the semi-autographic records, one style of apparatus for two operators and one for one operator, is available in printed form.

#### Executive Committee's Report

The annual report of the executive committee showed that the membership is now 2167 against 2071 at the time of the last annual meeting. The result of the increase in the dues has changed a deficit at the beginning of the fiscal year of \$6,407 to a surplus of \$3,140 on Dec. 30, 1916. The report mentioned that the translation by the U. S. Department of Commerce of some of the standard specifications into foreign languages had been delayed by "a combination of circumstances beyond the control of the department," but Secretary Redfield wrote that he hoped the first printed translated specifications "may be available before the June meeting." The executive committee noted that three representatives of the society had been appointed to confer with representatives of the American Society of Mechanical Engineers to consider questions affecting A. S. M. E. boiler code. These appointees are F. J. Cole, American Locomotive Co.; C. F. W. Rys, metallurgical engineer, Carnegie Steel Co., and C. D. Young, engineer of tests, Pennsylvania Railroad.

Officers for next year were elected as follows:

President, Gen. W. H. Bixby, brigadier general of the United States Army, retired, Washington, D. C.

Vice-president, Prof. Edwin Orton, Jr., dean of the College of Engineering, Ohio State University, Columbus.

Members of the executive committee: J. A. Capp, chief of the testing laboratory, General Electric Company, Schenectady, N. Y.; Dr. W. F. M. Goss, University of Illinois, Urbana, Ill.; W. M. Kinney, inspecting engineer, Universal Portland Cement Company, and C. D. Young, engineer of tests, Pennsylvania Railroad, Altoona, Pa.

#### "Old Guard" Honors Amos Whitney

In honor of the eighty-fifth birthday of Amos Whitney, Hartford Conn., the "Old Guard" of the Pratt & Whitney Co., which was founded by Mr. Whitney, gathered in Hartford, June 20. After a reception at the Allyn House, the party motored to the Country Club, Farmington, where a dinner was enjoyed. The toastmaster was Worcester R. Warner, Warner & Swasey Co., Cleveland, who, in his introductory remarks referring to the Pratt & Whitney Co., said: "Its fame extended across the ocean and many of us worked on the equipment for the German armories then being built at Erfurt, Danzig and Spandau. We little thought at that time that the guns made with Pratt & Whitney tools would some day be turned against us and our own country."

Among the speakers at the dinner were Clarence E. Whitney, president Whitney Mfg. Co., in which his father is still active as secretary and treasurer; B. M. W. Hanson, vice-president and general manager Pratt & Whitney Co.; Ambrose Swasey, Warner & Swasey Co., Cleveland; John Johnston, Potter & Johnston Co., Pawtucket, R. I.; John R. Reynolds, Smyth Mfg. Co., Hartford; George Q. Whitney, brother of Amos Whitney and president Phoenix Mfg. Co., Hartford; and J. N. LaPointe, J. N. LaPointe Co., New London, Conn.

Others present who were graduates of the Pratt & Whitney shops were George C. Bardons, Bardons & Oliver Co., Cleveland; G. E. Randles, vice-president, and A. W. Foote, president, Foote-Burt Co., Cleveland; Charles E. Davis, general manager Simplex Automobile Co., New Brunswick, N. J.; Charles F. Tucker, W. W. & C. F. Tucker, Hartford; Warren J. Belcher, Whitney Mfg. Co., Hartford; and Walter L. Cheney, Lucas Machine Tool Co., Cleveland.

## CONTRACTS FOR VESSELS

### Both Steel and Wooden Construction Included in New Orders

WASHINGTON, June 26, 1917.—The United States Shipping Board Emergency Fleet Corporation announces the execution, during the week ending June 25, of five additional contracts covering 10 steel vessels, four wooden vessels and 20 wooden hulls, as follows:

Moore & Scott Iron Works, San Francisco, Cal.; Works, Oakland, Cal.: Ten complete steel cargo carrying steamers; deliveries, first and second in February, 1918; third in March, 1918; fourth and fifth in June, 1918; sixth in August, 1918; seventh and eighth in October, 1918; ninth and tenth in November, 1918.

Portland Ship Ceiling Co., 130 Commercial Street, Portland, Me.: Four wooden hulls; deliveries, Feb. 1, 1918, March 15, 1918, May 1, 1918, June 15, 1918, respectively.

Universal Shipbuilding Co., 25 Broad Street, New York: Works, Houston Ship Canal, Harris County, Texas; Twelve wooden hulls; deliveries, first and second, seven months after completion of the ways; third and fourth, eight months after completing ways; fifth and sixth, nine months after completing ways; seventh and eighth, 10 months after completing ways; ninth and tenth, 11 months after completing ways; eleventh and twelfth, 12 months after completing ways.

McBride & Law, Beaumont, Texas: Four wooden hulls; deliveries, first hull on or before March 1, 1918; second hull on April 1, 1918; third hull on May 1, 1918; fourth hull on June 1, 1918.

Newcomb Life Boat Co., Hampton, Va.: Four complete wooden cargo carrying steamers; deliveries, first steamer by Jan. 15, 1918; one steamer every 60 days thereafter, so that last steamer will be delivered on or before July 16, 1918.

In addition to the foregoing, a contract for 12 vertical triple expansion marine engines has been awarded to the Ellicott Machine Corporation, Baltimore.

Summary to date: Total number of contracts for ships and hulls executed, 22; complete steel ships, 38; complete composite ships, 32; complete wooden ships, 34; total complete ships, 104; total wooden hulls, 72; total number of ships and hulls contracted for, 176; total number of contracts for marine engines executed, 1; total number of marine engines contracted for, 12.

#### Buffalo Copper Mill Sold

Announcement is made by William A. Morgan, president and general manager of the Buffalo Copper & Brass Rolling Mill, Buffalo, of the sale of the company to the American Brass Co., of which Charles F. Brooker of Ansonia, Conn., is president. The business and plant of the Buffalo company will pass formally to the purchasing company after the ratification of the sale by the stockholders of the former company at a meeting to be held July 6. The consideration, which is presumed to amount to several millions, has not been made public.

The Buffalo plant is an extensive one and employs over 5000 men, and increased operations will start in the mill shortly after the change in ownership. Aside from the withdrawal of Mr. Morgan from the company the organization of the old company will be continued by the new owners.

The American Brass Co. has three mills at Waterbury, Conn.; two at Ansonia and one each in Torrington, Conn., and Kenosha, Wis.

#### New Jersey Zinc Co. to Make Sheet Zinc

The New Jersey Zinc Co. is erecting a new sheet zinc mill at Palmerton, Pa., which will probably be in operation some time in July. The company's regular Horsehead brand of spelter will be used in the manufacture of the sheet zinc and nearly all gages and commercial sizes up to 24 in. will be rolled.

Tin exports from the Federated Malay States in April were 3251 tons, against 3177 tons and 3619 tons in April, 1916 and 1915 respectively. To May 1, 1917, they were 12,850 tons, as compared with 14,561 tons and 15,447 tons for the same four months in 1916 and 1915 respectively.



# Iron and Steel Markets

## REGULATION OF PRICES

### Its Uncertainties Cause Uneasiness

#### Decision on Ship Steel Still Awaited—Further Price Advances

The agitation of Government control of prices for iron and steel products and for coal and coke has added a new and serious element of uncertainty to the situation, and the perplexities of buyers have increased as prices have made further advances.

The possibility of disturbance to business by ill-considered price fixing is a repressing influence, and steel manufacturers who for some time have refrained from selling because they were reserving their product for Government use now have added reason for taking no new steps.

So far as Government ship steel is concerned, the question of authority to decide on contract prices is approaching final determination at Washington, and on the outcome hang other questions of Government policy regarding steel. If the counsels of practical men prevail, the steel manufacturers' committee and the Government's representatives will agree on a basis approximating that on which current deliveries are being made on long-time contracts. These, as is well known, are quite below the levels reached in the scramble for the small amount of steel that is only secured for early shipment by bidding up prices.

Buyers of pig iron and of finished steel have been much exercised over the proposals to fix maximum prices in transactions with private consumers. While the undertaking is viewed as impossible, there is unconcealed uneasiness over the possibility that the mills will be able to do less of their own initiative as new measures become effective.

Government buying is steadily increasing, part of it coming through departments and committees which arrange with manufacturers as to prices, and part of it in quasi commandeering orders, on which prices will be fixed later. For the army cantonments, contracts were put through quickly. The wire-nail purchases amounted to 42,000 kegs, of which half went to the leading producer, while the remainder was distributed among independents. The price was \$3.20, whereas the market price of independent makers is \$4. The cast-iron pipe and radiation contracts for the cantonments are in abeyance. If steam heating is general, 40,000 tons of radiation will be required.

Japanese buyers are pressing for ship plates, taking up every ton for which their bids are entertained. From 40,000 to 50,000 tons of such in-

quiry is still pending. The condition continues, that plate prices are made by the insistent offers of consumers. In one case 9.90c. for 1000 tons for early shipment was declined and for delivery later in the year 9.75c. was bid on 5000 tons.

Concerning the majority of rolled products the week's developments have been unimportant. That tin plate supplies will be adequate to the canning demand is now considered more certain. The sheet shortage evidently would have been serious if the rate of automobile building had kept up. As it is, premiums of \$10 to \$20 are paid for prompt shipments. Bar iron output has suffered from the high prices of scrap and common iron in the Middle West has gone to 5c. Pittsburgh.

At Chicago a \$5 advance has been made in light rails, bringing 25-45 lb. rails up to \$65.

Pig-iron buying has continued in spite of advances of \$1 to \$3, but the altitude is causing consumers to think seriously of the dangers of the decline when it comes. Some of the buying for 1918 has been plainly speculative, and some thought is being given to the share pig iron would necessarily take in any scheme of control of steel prices.

Export pig-iron inquiries have had little consideration lately, in view of the great difficulties in getting bottoms and the holding up in May of large shipments that had gone to seaport, particularly in the South. For Italy, 50,000 to 60,000 tons of Bessemer iron is wanted for shipment in the second half, but the number of furnaces that could supply any part of this is very small. On an inquiry for 5000 to 10,000 tons of basic for Japan, \$62 at furnace has been named at St. Louis.

The market for steel melting scrap shows some irregularity and much less excitement. In the Middle West, prices have ranged from \$45 to \$48.

## Pittsburgh

PITTSBURGH, June 26.

The week under review has not shown the excitement in advances in prices or in new buying of pig iron, steel, scrap and some lines of finished steels that characterized the previous two or three weeks. Prices are just as strong as ever, but on pig iron and steel are not any higher, and this is also true of finished products. There is still a lively buying movement in scrap, and prices on some grades are up \$1 to \$2 per ton over last week. Heavy steel melting scrap has sold in the past week all the way from \$45 up to \$48 per gross ton, delivered to consumers' mills. There is a heavy demand for spot furnace coke, and it is bringing as high as \$13 per net ton, at oven. Reports that the prices on scrap had had a serious break, due to the retirement of the Carnegie Steel Co. as a buyer, prove to have been incorrect. There is not the heavy buying in old material of two weeks ago, but prices on all

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	June 27, 1917.	June 20, 1917.	May 29, 1917.	June 28, 1916.
No. 2 X, Philadelphia...	\$50.75	\$49.75	\$45.50	\$19.75
No. 2, Valley furnace...	53.00	53.00	43.00	18.25
No. 2, Southern, Cin'ti...	47.00	46.90	42.90	16.90
No. 2, Birmingham, Ala.	45.00	44.00	40.00	14.00
No. 2, furnace, Chicago*	55.00	52.00	46.00	19.00
Basic, del'd. eastern Pa.	50.00	48.00	42.50	19.50
Basic, Valley furnace...	50.00	50.00	42.00	18.00
Bessemer, Pittsburgh...	55.95	55.95	45.95	21.95
Malleable Bess., Ch'go*	55.00	52.00	46.00	19.50
Gray forge, Pittsburgh...	47.95	47.95	40.95	18.70
L. S. charcoal, Chicago...	57.00	52.00	50.25	19.75

### Rails, Billets, etc., Per Gross Ton:

Bess. rails, heavy, at mill	38.00	38.00	38.00	38.00
O.-h. rails, heavy, at mill	40.00	40.00	40.00	40.00
Bess. billets, Pittsburgh...	100.00	100.00	95.00	42.00
O.-h. billets, Pittsburgh...	100.00	100.00	95.00	42.00
O.-h. sheet bars, P'gh...	105.00	105.00	95.00	42.00
Forging billets, base, P'gh	125.00	125.00	110.00	69.00
O.-h. billets, Phila.....	110.00	110.00	95.00	50.00
Wire rods, Pittsburgh...	95.00	95.00	90.00	50.00

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	4.659	4.659	4.159	2.659
Iron bars, Pittsburgh...	4.75	4.75	4.00	2.50
Iron bars, Chicago.....	4.10	4.00	3.50	2.35
Steel bars, Pittsburgh...	4.50	4.50	4.00	2.75
Steel bars, New York...	4.669	4.669	4.169	2.919
Tank plates, Pittsburgh...	9.00	8.00	7.00	3.25
Tank plates, New York...	9.169	8.669	7.169	3.419
Beams, etc., Pittsburgh...	4.50	4.50	4.00	2.50
Beams, etc., New York...	4.669	4.669	4.419	2.669
Skelp, grooved steel, P'gh	4.00	4.00	3.50	2.35
Skelp, sheared steel, P'gh	6.00	6.00	5.50	2.45
Steel hoops, Pittsburgh...	5.25	5.25	4.25	2.75

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	8.00	8.00	7.50	2.90
Sheets, galv., No. 28, P'gh	9.75	9.75	9.00	4.60
Wire nails, Pittsburgh...	4.00	4.00	3.50	2.50
Cut nails, Pittsburgh...	4.65	4.65	4.00	2.60
Fence wire, base, P'gh...	3.95	3.95	3.45	2.45
Barb wire, galv., P'gh...	4.85	4.85	4.35	3.35

### Old Material, Per Gross Ton:

Iron rails, Chicago.....	\$49.00	\$47.00	\$38.50	\$18.00
Iron rails, Philadelphia...	52.00	50.00	35.00	20.00
Carwheels, Chicago ....	43.00	43.00	33.00	12.00
Carwheels, Philadelphia...	35.00	35.00	30.00	16.00
Heavy steel scrap, P'gh...	45.00	42.00	30.00	15.75
Heavy steel scrap, Phila...	39.00	37.00	26.00	14.75
Heavy steel scrap, Ch'go	39.00	39.00	32.00	14.00
No. 1 cast, Pittsburgh...	38.00	37.00	26.00	15.75
No. 1 cast, Philadelphia...	39.00	32.00	30.00	16.00
No. 1 cast, Ch'go (net ton)	32.00	32.00	26.00	11.50
No. 1 RR. wrot, Phila....	57.00	55.00	42.00	19.50
No. 1 RR. wrot, Ch'go (net)	44.00	44.00	36.00	14.75

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$13.00	\$11.50	\$8.50	\$2.40
Furnace coke, future....	9.50	9.50	8.00	2.50
Foundry coke, prompt...	14.00	12.00	9.50	3.25
Foundry coke, future....	10.00	10.00	9.00	3.50

### Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	32.50	32.50	32.50	27.75
Electrolytic copper, N. Y.	32.50	32.50	32.50	26.50
Spelter, St. Louis.....	9.12½	9.50	9.37½	11.50
Spelter, New York.....	9.37½	9.75	9.62½	11.75
Lead, St. Louis.....	11.50	11.50	11.22½	6.65
Lead, New York.....	11.70	11.75	11.37½	6.80
Tin, New York.....	62.00	63.50	65.00	39.00
Antimony (Asiatic), N. Y.	19.00	19.00	24.00	17.50
Tin plate, 100-lb. box, P'gh	\$12.00	\$11.00	\$8.50	\$6.00

grades remain very strong. The steel mills, more and more, are conserving future output to meet demands that are certain to be made on them by the Government for anywhere from 25 to 40 per cent of their output. This applies to mills rolling all kinds of finished steel products. Users of billets and sheet bars who have regular sources of supply state that recently they have not been getting more than 25 to 50 per cent of the steel they need and sometimes not that much. One large user of small billets in the past three weeks has received only about 20 per cent of the quantity of steel that should have been shipped. The outlook is that the supply of semi-finished steel in billets and sheet bars to outside customers will grow less, instead of increasing. The whole cry now is that finishing mills are not getting steel, and this is cutting down output on all kinds of finished products. The sub-committee on car supply for the movement of coke and ore is working out this problem satisfactorily, and before long it is believed there will be sufficient cars to move ore and coke promptly to consumers. A detailed statement of what this committee is doing appears elsewhere in this issue.

**Pig Iron.**—All kinds of reports are current as to sales of Bessemer iron at \$58 to \$60, and basic at \$53 to \$55 for this year delivery. Sifted down, these reports are based on very small lots of basic and Bessemer iron that have possibly been sold at the above named prices, but there have been no large transactions in either Bessemer or basic at these figures. New inquiry is fairly active, and as high as \$53 is quoted on basic and \$58 on Bessemer, but these are asking prices and do not represent the actual market. There is considerable activity in foundry iron, and additional sales of No. 2 have been made for this year delivery at \$53 to \$55. One sale of 300 tons of No. 2 foundry has been made for first quarter of 1918 at \$58 at maker's furnace. We also note a sale of 500 tons of Bessemer for

late delivery this year at the reported price of \$58, at furnace. A sale is also reported of 5000 tons of basic for first half of 1918 at \$54, Valley furnace. We quote standard Bessemer iron at \$55 to \$58, malleable Bessemer \$53 to \$55, No. 2 foundry \$53 to \$55, gray forge \$47 to \$48, and basic \$50 to \$51, all at Valley furnace and for delivery this year. For first half of 1918, both Bessemer and basic iron have probably sold at higher prices. The freight rate from Valley furnaces to the Cleveland or Pittsburgh districts is 95c. per ton.

**Billets and Sheet Bars.**—Not much semi-finished steel in the forms of sheet bars and billets is being sold in the open market, simply for the reason that the steel cannot be had. Soft Bessemer or open-hearth sheet bars for fairly prompt delivery would readily bring \$105 to \$110 at maker's mill, and soft Bessemer or open-hearth billets close to \$100, maker's mill. There is a good deal of new inquiry for forging billets. One sale of 125 tons and another of 200 tons of any ordinary carbons have been made at about \$125 per gross ton delivered. An active inquiry is in the market for 10,000 tons of forging billets for last half of the year delivery, but where any steel mills can be found that will take even a part of this business is a serious question. Several mills to which the inquiry was put up, asking what part of it they would agree to take, promptly replied that they could not take any of it.

We now quote soft Bessemer and open hearth billets at \$95 to \$100 and soft Bessemer and open hearth sheet bars at \$105 to \$110, maker's mill, Pittsburgh or Youngstown. We quote forging billets at \$125 to \$135 per ton for ordinary sizes and carbons, f.o.b. maker's mill.

**Ferromanganese.**—The new inquiry for ferromanganese for delivery over last half of this year and in first half of 1918 is very active and prices are strong and slightly higher. Recently, one maker of domestic ferromanganese was quoting as low as \$350 per gross ton at furnace for first half of next year delivery, but after making several fairly large sales at this price, advanced

his price to \$400 at furnace. We now quote 80 per cent domestic ferromanganese at \$450 per gross ton, at furnace, for small lots, and note sales of four or five cars at that price. We quote \$425 to \$450 for last half of the year and \$400 for first half of 1918. One Western steel interest has bought 1200 tons of 80 per cent domestic ferromanganese, equal deliveries over first half of 1918, at \$400 per gross ton at maker's furnace. Small lots of 50 per cent ferrosilicon for prompt shipment, are bringing from \$225 to \$275 per gross ton, at furnace. Spiegeleisen is selling at about \$4 per unit, and we quote 18 to 22 per cent at \$85 per gross ton at maker's furnace. The demand for Bessemer ferrosilicon and also for silvery iron is fairly active, but most consumers are covered over the remainder of this year.

We quote 9 per cent Bessemer ferrosilicon at \$89, 10 per cent \$90, 11 per cent \$95, 12 per cent \$100, 13 per cent \$105, 14 per cent \$115, 15 per cent \$125, and 16 per cent \$135. We now quote 7 per cent silvery iron at \$51 to \$52, 8 per cent \$52 to \$53, 9 per cent \$54 to \$55, 10 per cent \$55 to \$56, 11 and 12 per cent \$57 to \$58. All f.o.b. makers' furnace. Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having a uniform freight rate of \$2 per gross ton for delivery in the Pittsburgh district.

**Steel Rails.**—No new orders are being placed for standard sections, but the new demand for light rails is very active from all classes of consumers. The Carnegie Steel Co. has no light rails to offer for delivery before second half of 1918, and the Cambria Steel Co. is also reported to be sold up through first half of next year. Makers of re-rolling rails who can ship out fairly promptly are getting as high prices as those ruling on new light rails and in some cases higher.

**Structural Material.**—The new inquiry from the general trade is quiet, and most of the new business being placed is coming from the Government. The order taken by the McClintic-Marshall Co. for a crane runway for the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was for 5500 tons instead of 9300 tons as previously reported. The same company has taken 750 tons of struts for the Panama Canal. The American Bridge Co. has taken 3000 tons for a new steel foundry building at the League Island Navy Yard, and 800 tons for a machine shop building extension at the Brooklyn Navy Yard.

**Tin Plate.**—It is now believed that owing to the strong co-operations of the tin plate mills with the Government, an adequate supply of bright tin plate will be available during the summer months for the making of containers for perishable foods. Some mills that heretofore made both bright and terne plate have been working for several months on bright plate alone, and this has materially increased the output of the latter. The demand for terne plate is dull, as consumers turn to other cheaper materials for roofing purposes. There would be no trouble getting \$15 per base box for bright plate on new domestic or export orders and sales of tin plate on domestic orders have been made at that price. On the small current demand to regular customers, mills are quoting primes from stock at about \$12 per base box at mill, and 25c. for wasters. Nominal prices on terne plate are found on page 1581.

**Plates.**—Prices on plates are still running wild, and no one can tell what the actual market is. Recently an inquiry for 1400 tons of very desirable sizes and thicknesses of sheared plates for delivery in third quarter was put up to several mills at the offered price of 9½c. per pound and was promptly turned down, as none of the mills could make the delivery. When the top in prices of plates will be reached is a serious question, but it is not in sight yet. Prospects are that before long the Government will take 40 per cent or more of the output of plates of domestic mills for its own use and for our allies, and this means that domestic consumers will have more trouble than ever in finding mills that can give them any plates. The steel car companies are not getting more than 25 to 40 per cent of the plates they need, and even this may be cut down in the very near future. The Carnegie Steel Company has placed a contract with the American Car & Foundry Company for 60 50-ton tank cars for its Clairton, Pa., by-product plant, and the Union Railroad, owned and operated by

the Carnegie Steel Company, has placed 1000 steel hoppers with the Greenville Steel Car Company, Greenville, Pa. The Carnegie company is in the market for six 50-ton steel gondolas. It is almost impossible to correctly quote actual prices on plates, every sale made depending on who the buyer is, whether he is applying to a regular source of supply, and how soon he wants the plates, and the quantity. We now quote ¼-in. and heavier sheared plates at 9c. to 10c. at mill for delivery in third and fourth quarters, while plates from warehouse in small lots for fairly prompt delivery bring 12c. and higher. On ship plates, mills are quoting from 10c. to 12c. to domestic yards. The above prices apply only on domestic orders, as the Government purchases at very much lower figures.

**Sheets.**—All the sheet mills are cutting down allotments to regular customers who have been on their books for years, and are absolutely refusing to quote on new business not coming from regular customers, conserving as much of their output of sheets of all grades for Government needs as much as they possibly can. It is expected the sub-committee on sheets of the American Iron & Steel Institute will shortly place very heavy orders with the sheet mills for sheets to be used in making camp stoves, also for cantonments and for other war purposes. There will also be a heavy demand for sheets for indirect Government business, and before long it is expected that many of the sheet mills will be devoting 50 per cent or more of their output to Government orders, direct and indirect. The scarcity in the supply of sheets for the general trade is steadily getting more acute, and premiums of \$10 to \$20 per ton over what are regarded as regular prices are being paid for sheets for fairly prompt shipment. Prices will be found on page 1581.

**Iron and Steel Bars.**—The output of the mills on both iron and steel bars is virtually sold up for this year, and the leading makers of steel bars have heavy contracts on their books for delivery in first half of next year. The Government will be a heavy buyer of bars for war purposes, and the mills are not anxious to take on more business, as they desire to conserve as much of their output as they can for the expected Government demand. Prices will be found on page 1581.

**Hoops and Bands.**—There are no regular prices on either hoops or bands. Small lots of steel hoops for fairly prompt shipment bring 5.50c. to 6c., and steel bands 4.50c. to 5c. at mill. Regular customers are covered over this year at lower prices on contracts placed some time ago.

**Muck Bar.**—We quote best grade of muck bar made from all pig iron at \$90 to \$100 per gross ton at maker's mill.

**Wire Rods.**—The domestic and also the export demand for wire rods is still abnormally heavy and local makers report they are turning down nice business in rods every day, which they are unable to supply. The output of rods is being cut down to some extent, as more steel is being diverted by steel mills for other products. Sales of soft Bessemer and open hearth rods have lately been made to domestic trade at \$95 per ton and higher at mill, and soft rods for shipment to Canada have sold recently at \$100 at mill and better. Rods running above 0.60 carbon have sold at \$120 at mill. Prices in detail on page 1581.

**Wire Products.**—The wire mills, more and more, are conserving their output for regular customers only and for the Government demand, which, it is expected, will be very heavy. All sales managers of wire mills have been under instructions for some time not to accept any orders for nails or wire without first submitting them to the home office. Quantities of nails wanted by regular customers are being scaled down and there are not enough nails by a good deal to meet the demand. Contracts for wire nails at the new price of \$4 per keg, adopted June 15, are readily made by customers for delivery at the convenience of the mills. The American Steel & Wire Co. is still quoting to its regular customers wire nails on the basis of \$3.20 and bright basic wire \$3.25 per 100 lb. The fact that this wide difference exists in price on wire nails and



wire being quoted by the American Steel & Wire Co. and the independent mills is leading to some confusion in the jobbing trade. In many cities there are jobbers who buy practically their entire supply of nails and wire from the American company, and in the same cities there are jobbers who buy their supply from independent mills, and the fact that the latter are paying \$16 per ton more for wire nails than is being charged by the American company has led to a good deal of complaint from jobbers who buy from independent mills, who say they are being undersold by their competitors. Just how this problem will be worked out is a question. Prices in effect from June 15 by the independent mills are published on page 1581.

**Shafting.**—The new demand for shafting is heavy, and specifications against contracts are coming in very freely. While there has been some falling off in orders lately from the automobile trade, this has again come up to usual size, indicating that the automobile builders are already starting to build motor trucks and other vehicles for the Government, in the manufacture of which very large quantities of shafting will be used. Specifications from the screw stock machine trade are very heavy. Local makers of shafting are virtually sold up for this year, and any maker that can furnish shafting fairly promptly can get close to list price. Discounts on cold rolled shafting now range from list to 10 and 5 per cent off, the 15 per cent discount having almost disappeared.

**Railroad Spikes and Track Bolts.**—One local maker is out of the market as a seller of spikes, having its entire output sold up for this year. Another maker reports that its output is cut down very much because of inability to get steel. This maker of spikes uses ordinarily 1000 tons 1½-in. billets per week when running single turn, but for some time past has not been receiving on an average more than 200 tons of 1½-in. billets per week, and in some weeks received less, thus cutting the output of spikes of this particular maker to about 20 per cent of normal. The demand for spikes is heavy, and for prompt shipment almost any prices can be obtained. The new demand for boat spikes is abnormally heavy, but it is hard to find any maker who can furnish them, owing to the shortage in the steel supply. Prices on all grades of spikes are up \$5 per ton or more. The new demand for track bolts and also specifications against contracts are very heavy, and prices are strong. Prices are published on page 1581.

**Cold Rolled Strip Steel.**—As noted last week, the demand for cold rolled strip steel is heavy and the supply of steel is steadily shortening. Makers of cold rolled strip steel are now selling only for delivery in 60 days, insisting that 50 per cent of the specification must accompany each order and the other 50 per cent within 30 days. On this kind of contracts mills are charging 9c. at mill and small current orders prices range from 10c. to 12c. at mill. Terms are 30 days net, less 2 per cent for cash in 10 days, sold in quantities of 300 lb. or more.

**Nuts and Bolts.**—The new demand is still very heavy, and owing to the shortage in steel and also in labor to some extent, makers of nuts and bolts are not able to make their full output. There is also some export demand, but this is being turned down, as makers of nuts and bolts desire to conserve their entire output for domestic trade. Prices are very firm, but are not likely to be advanced in the near future, unless there should be a further advance in semi-finished steel. Prices in detail on page 1581.

**Rivets.**—Makers report the new demand heavy, but the supply of steel is unsatisfactory, and they are not able to make a full output. There is still a good foreign demand, but this is not being satisfied, as the needs of domestic customers are heavier than makers can supply. The prices on structural rivets are \$5.25 per 100 lb., base, and on cone head boiler rivets \$5.35, base, per 100 lb., f.o.b. Pittsburgh. Terms are 30 days net, or one-half of 1 per cent. off for cash in 10 days.

**Wrought Pipe.**—Late last week, La Belle Iron Works and the Wheeling Steel & Iron Co. issued new cards on steel pipe, lowering discounts 8 points to 13

points on different sizes or an advance of \$16 to \$26 per ton. However, no other makers of steel pipe have advanced prices and are still selling to regular customers on the discounts as adopted May 1. The National Tube Co. is still taking care of its trade as best it can on the discounts adopted April 1, which represents prices that are \$12 per ton less than are being charged by independent mills, and from \$28 to \$38 per ton less than are being quoted by the two independent mills that advanced their prices last week. No changes whatever have been made in discounts on iron pipe, those adopted on May 1 still being in effect. None of the pipe mills has any pipe of consequence to sell for this year, but all the mills are trying to take care of the regular trade as best they can. All kinds of inquiries are being put out by gas and oil interests for line pipe for this year delivery, but mills are steadily turning these down, as they cannot possibly spare the pipe. The Gulf Refining Co. of this city has covered on a part of its needs of oil country goods for 1918, amounting to 15,000 tons or more, this tonnage having been distributed among several mills. Reports that this company is in the market for 100 miles of 6-in. line pipe are not officially confirmed. On lap weld pipe, mills are practically sold up for all of this year, and some have heavy business entered for 1918. The new demand for butt weld sizes of iron and steel pipe is quiet, and mills can make deliveries in 10 to 12 weeks from date of order. The falling off in new building operations all over the country has greatly restricted the new demand for butt weld pipe. The discounts in effect on iron and steel pipe, aside from these given in the new cards of La Belle Iron Works and Wheeling Steel & Iron Co. are given on page 1581.

**Boiler Tubes.**—Conditions in the boiler tube trade are unchanged. Almost all the new sales of either iron or steel tubes are at prices carrying heavy premiums, this being anywhere from \$20 to \$40 per ton or more over regular nominal discounts. The Government is being furnished hundreds of thousands of feet of boiler tubes, taking 25 per cent or more of the output of the makers. On seamless steel tubing, makers are sold up for a year to 18 months. The new demand for oil country goods is abnormally heavy, and consumers are offering heavy premiums on prices for them. Nearly any price can be obtained for oil country goods, if fairly prompt delivery can be made. Several of the larger makers of steel tubes are taking care of the regular trade as best they can, and at prices close to discounts, but nearly all new sales carry very heavy premiums. Nominal discounts on iron and steel tubing are given on page 1581.

**Coke.**—The new demand for prompt blast furnace coke is very active, and at present is larger than the supply, with the result that prices have again advanced during the week. The car supply last week in the coke region averaged 60 to 65 per cent, and on Monday, June 25, was 80 per cent. Producers of furnace coke are not anxious to make contracts for last half of the year delivery, preferring to sell their furnace coke from month to month at whatever prices may be ruling. Some coke producers believe the Government may later take over the coal and coke business, regulating the output, and also prices, and this is another reason why they are not anxious to make contracts. One leading coke interest whose furnace coke has a very high reputation for quality, has contracts with four or five leading consumers in the valleys and in the East that expire July 1, and has stated that it will not make any prices on contracts, but will furnish its regular customers with furnace coke, the price to be fixed each month. Cars for shipment East over the Pennsylvania and Baltimore & Ohio railroads are very scarce, and for this reason furnace coke for such shipment is bringing about 50c. per ton higher prices than for shipment over the Pittsburgh & Lake Erie Railroad. We now quote high grade blast furnace coke for Eastern shipment at \$12.50 to \$13, and for shipment to the valleys and other Western points, \$12 to \$12.50 per net ton at oven. Nothing is being done on contracts for blast furnace coke. We quote best grades of 72-hour foundry coke at \$12.50 to \$13, and on contracts,

\$10 to \$11 per net ton at oven. The Connellsville *Courier* gives the output of coke in the Upper and Lower Connellsville regions for the week ending June 16 as 354,459 tons, a decrease over the previous week of 6629 tons.

**Old Material.**—The local scrap market is still very active, several large consumers buying heavily, and prices are from \$2 to \$3 per ton higher on nearly all grades. There is a heavy new demand for steel melting scrap, low phosphorus melting stock and borings and turnings, and Pittsburgh consumers are insisting that dealers anticipate shipments. One large consumer has bought heavy steel melting scrap very freely, and is said to have paid as high as \$45 and better, delivered. At least one sale of 1500 tons of selected heavy steel melting scrap has been made at \$47, delivered. There is a lively demand for low phosphorus melting stock and sales have been made at \$60, with reports that \$65 has been done. Turnings have brought \$23 to \$24, and cast iron borings as high as \$26, delivered. The supply of scrap of all kinds is light, and some dealers who have fairly large stocks in their yards are holding it for higher prices. The fact that Bessemer and basic pig iron are still going up is the one main reason why dealers believe that all kinds of melting scrap used in open-hearth steel practice will be still higher. The demand for scrap in the Youngstown and Sharon districts is very active, and consumers in both valleys are buying freely.

Prices for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, are as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered .....	\$45.00 to \$47.00
No. 1 foundry cast .....	38.00 to 40.00
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. ....	48.00 to 50.00
Hydraulic compressed sheet scrap .....	35.00 to 38.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mill, Pittsburgh district .....	28.00 to 30.00
Bundled sheet stamping scrap .....	26.00 to 28.00
No. 1 railroad malleable stock .....	35.00 to 37.00
Railroad grate bars .....	20.00 to 21.00
Low phosphorus melting stock .....	60.00 to 65.00
Iron car axles .....	60.00 to 65.00
Steel car axles .....	60.00 to 65.00
Locomotive axles, steel .....	65.00 to 70.00
No. 1 busheling scrap .....	34.00 to 35.00
Machine-shop turnings .....	23.00 to 24.00
Old carwheels .....	40.00 to 42.00
Cast-iron borings .....	26.00 to 27.00
*Sheet bar crop ends .....	55.00 to 58.00
No. 1 railroad wrought scrap .....	48.00 to 50.00
Heavy steel axle turnings .....	29.00 to 30.00
Heavy breakable cast scrap .....	30.00 to 32.00

\*Shipping point.

## Chicago

CHICAGO, June 25.

With the lack of specific information as to what the Government will require or pay for steel products, there is now coupled discussion as to the possibility of the official fixing of prices which private consumers are to pay. The latter proposition seems an impossible one to many minds, yet the talk is disconcerting. It is asserted that an effort to fix the price of even one product would be far-reaching and be likely to result in great confusion. There seems to be more uncertainty to-day as to how much, in the future, the mills will be able to do of their own initiative than at any time heretofore. It is questioned how far the steel industry can support the Government through the payment of war taxes, supplying war material at low prices and generous investments in war bond issues, and yet get a square deal, if restrictions are too sweeping. A Western mill will supply 7250 tons of shrapnel steel, deliveries to begin in July and spread over the remainder of the year at 3.75c., Pittsburgh base. The material will go to a company which has taken a contract for 1,400,000 of the 9,000,000 shells which the Government has ordered. The shipyards are urging the mills to accelerate production. Structural jobs are notable only because of their absence, and the situation, with regard

to other steel products, has changed but little. Last or first-half Northern No. 2 foundry iron is quoted at \$55, furnace, and Southern No. 2 for the same deliveries are \$45, Birmingham. Cast-iron pipe has been advanced \$5 a ton. Something of a halt has come to the old material market, and quotations are softer, if not lower than they were a week ago.

**Pig Iron.**—A maker of Southern iron to-day announced a definite quotation for last half delivery, fixing the quotation for standard No. 2 foundry at \$45, Birmingham, or \$49, Chicago, but at this price orders are subject to furnace approval. The same level is quoted for first half delivery, but for this position submission to the furnace is not required. Until to-day a quotation for last half was almost unobtainable, while the first half was held at \$42, Birmingham. At the latter price, and previously at \$41, some excellent tonnages were booked, including one lot of 4000 tons taken by a plow manufacturer. Other lots ranging from 500 to 2000 tons have been placed. Small odd lots of last half Southern have been purchased at \$50, Chicago, or \$46, Birmingham. Last half iron is unquestionably tight, and some makers have been unable to quote at all. For Northern No. 2 foundry, basic and malleable Bessemer, also for Northern high phosphorus, \$55, furnace, is quoted, and sales have been made at this price. The makers are heavily sold ahead for both this year and the first half of next. Definite quotations for charcoal iron are difficult to obtain for the reason that furnace confirmation is required. One maker quotes \$55 to \$60, furnace, according to grade, sales having been made at both these figures, but it is stated that the lower price will probably soon disappear, as the iron available in the next 12 months is gradually being reduced. On many inquiries no quotations are being made because of the desire to hold iron for regular customers. Other makers quote \$57.50 to \$60, furnace, for the first half of next year, stating they have none to sell for 1917 delivery. While some sellers of silvery iron cannot get quotations from the furnaces others have had \$80 named for 8 to 9 per cent. For 8 per cent, \$70 to \$80, furnace, is about the range. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer, and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 1 to 4 .....	\$57.00 to \$62.00
Lake Superior charcoal, Nos. 5 and 6 and Scotch .....	57.00 to 62.00
Northern coke foundry, No. 1 .....	55.50
Northern coke foundry, No. 2 .....	55.00
Northern coke foundry, No. 3 .....	54.50
Northern high-phosphorus foundry .....	55.00
Southern coke No. 1 f'dry and 1 soft .....	49.50
Southern coke No. 2 f'dry and 2 soft .....	49.00
Malleable Bessemer .....	55.00
Basic .....	55.00
Low-phosphorus .....	85.00
Silvery, 8 per cent .....	70.00 to 80.00

**Ferroalloys.**—For 80 per cent ferromanganese there is a steady flow of inquiry, with \$450 quoted for early delivery, \$400 for the last quarter and the first half.

**Plates.**—For common tank plates 9c. to 9.50c., Pittsburgh, is being offered, but a leading mill to which such proffers have been made has declined to take the business for the reason that it wishes to be fully prepared to handle Government demands, and at the same time wishes to impose the minimum amount of distress on its customers. It is probable that limited quantities can be obtained for delivery in the next two or three months at 9c. to 9.50c., although one mill is asking 10c., and is taking a limited amount of business for delivery in the third quarter only. The shipyards are urging the mills to increase production, and have in readiness material for the next lot of ships laid down. Jobbers' quotations are unchanged.

We quote for Chicago delivery of plates out of jobbers' stocks, 5c.

**Structural Material.**—That building operations involving shapes are few is evidenced by the fact that the leading interest announces but one building job, a manufacturing plant for the Linde Air Products Co., at Seattle, Wash., and that will be of concrete, requiring 119 tons of reinforcing rods. The Grand Trunk

System has inquired for 1000 box cars, and that is the sum total of the car business. As for prices, the leading interest reasserts that it has none, its attitude toward the market being unchanged, as it will be until the Government's requirements become more clearly defined. An Eastern mill is taking a limited amount of business, delivery in the third quarter, at 6c., Pittsburgh, or 6.189c., Chicago.

Jobbers quote 5c. for material out of warehouse.

**Bars.**—An agricultural interest is in the market for several thousand tons of steel bars for immediate shipment, and may be able to find a price a little lower than 4.689c., Chicago, the quotation of an Eastern mill for delivery in the third quarter, and perhaps the only open price. Rail carbon bars are quoted at 4c. to 4.25c., Chicago, and iron bars from 4.10c. to 5c., Chicago, one prominent maker asking 4.50c. to 5c., and another 4.10c. to 4.25c., illustrating the lack of unanimity even where those quoting have products to sell. Jobbers' prices are unchanged.

We quote prices for Chicago delivery as follows: Soft steel bars, 4.50c.; bar iron, 4.10c. to 5c.; reinforcing bars, 4.50c., base, with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent to plus 10 per cent.

**Wire Products.**—The leading interest still adheres to its nominal quotations based on 3.20c. for wire nails, while independent makers ask 4c. Some consumers, a maker of drive chain, for example, say they have been up against delayed deliveries so long that old orders are beginning to bear fruit, and the situation is clearing a little for them. Others protest against being allotted so much material and no more. Some of the latter, it is declared, are endeavoring to insure their future needs by stocking up to a greater extent than is usual. We quote the prices of the independent makers to jobbers, per 100 lb., Pittsburgh:

Plain fence wire, Nos. 6 to 9, base \$4.189; wire nails, \$4.189; painted barb wire, \$4.339; galvanized barb wire, \$5.039; polished staples, \$4.339; galvanized staples, \$5.039; all Chicago, carload lots.

**Sheets.**—No. 10 blue annealed sheets are quoted at 8.689c. to 9.939c., Chicago, and one pass cold rolled at 8.689c. to 9.189c. Sellers usually quoting on No. 28 galvanized have no prices to give, and the level may generally be stated at 10c. Pittsburgh, and upward. Seekers of sheets, new to the market, have received very little satisfaction from the mills of late. The jobbers have made an advance of  $\frac{1}{2}$ c. in their quotations for lots out of warehouse.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 9.50c.; No. 28 black, 9.50c.; and No. 28 galvanized, 11c.

**Rails and Track Supplies.**—Representatives of rail makers see little wisdom in purchases for 1919 delivery. No activity is reported. The price of light rails has been advanced \$5 per ton.

Quotations are as follows: Standard railroad spikes, 4c. to 4.10c. base; small spikes, 4.25c. to 4.35c., base; track bolts with square nuts, 5c. to 5.10c., all in carloads, Chicago; tie plates, \$60 to \$70 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38, base; open hearth, \$40; light rails, 25 to 45 lb., \$65; 16 to 20 lb., \$66; 12 lb., \$67; 8 lb., \$68; angle bars, 3.25c., base.

**Cast-Iron Pipe.**—Another advance, this time one of \$5 a ton, is announced by the pipe makers who are trying to maintain some sort of relation between the prices of their products and those of pig iron. Some important Government work has yet to be placed, including both pipe and condenser castings. Hammond, Ind., placed 100 tons with James B. Clow & Sons. Livingston, Mont., will open bids on 1500 tons to-morrow.

Quotations per net ton, Chicago, are as follows: Water pipe, 4 in., \$68.50; 6 in. and larger, \$65.50, with \$1 extra for class A water pipe and gas pipe.

**Old Material.**—There is a marked tendency on the part of both consumers and dealers to go slowly, and as a result prices are softer, although as yet there have been no pronounced recessions. Some are higher than they were a week ago. It is pointed out that consumers need scrap as much as ever, and that a

radical break is hardly probable. Some say prices may recede a little, but others maintain they will forge ahead. It requires so much capital to swing large deals that brokers hesitate to go ahead, particularly where the factor of speculation is strong. Lists have been issued by five or six railroads, but their aggregate is not great. We quote for delivery at buyers' works, Chicago, and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$49.00 to \$50.00
Relaying rails	59.50 to 60.00
Old carwheels	43.00 to 45.00
Old steel rails, rerolling	53.00 to 53.50
Old steel rails, less than 3 ft.	51.50 to 52.00
Heavy melting steel scrap	39.00 to 41.00
Frogs, switches and guards, cut apart	39.00 to 41.00
Shoveling steel	37.00 to 39.00
Steel axle turnings	26.00 to 27.00

Per Net Ton	
Iron angles and splice bars	\$49.50 to \$50.00
Iron arch bars and transoms	50.50 to 51.00
Steel angle bars	44.50 to 45.00
Iron car axles	54.50 to 55.50
Steel car axles	53.00 to 54.00
No. 1 railroad wrought	44.00 to 45.00
No. 2 railroad wrought	41.50 to 42.00
Cut forge	41.50 to 42.00
Pipes and flues	31.00 to 32.00
No. 1 busheling	34.00 to 35.00
No. 2 busheling	28.00 to 27.00
Steel knuckles	43.00 to 44.00
Steel springs	44.50 to 45.00
No. 1 boilers, cut to sheets and rings	27.50 to 28.00
Boiler punchings	27.50 to 28.00
Locomotive tires, smooth	50.00 to 50.50
Machine-shop turnings	20.00 to 20.50
Cast borings	19.50 to 20.50
No. 1 cast scrap	32.00 to 33.00
Stove plate and light cast scrap	24.50 to 25.00
Grate bars	26.50 to 27.00
Brake shoes	28.50 to 27.00
Railroad malleable	35.00 to 35.50
Agricultural malleable	29.50 to 30.50

**Rivets and Bolts.**—The Government has not yet taken definite action on its projected purchases of rivets and bolts, required for ship building, referred to a week ago. In a general way, business is as good as the manufacturers could want it to be, but they are anxious that Government business should be placed. The jobbers have advanced structural and boiler rivets.

Mill quotations are without change, as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 40; cut thread, 35-2 $\frac{1}{2}$ ; larger sizes, 25; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, with hot-pressed square nuts, 40-10; cut thread, 40; large size, 30; gimlet-point coach screws, 45; hot-pressed nuts, square, \$2.10 off per 100 lb.; hexagon, \$1.90 off. Structural rivets,  $\frac{3}{4}$  to  $1\frac{1}{4}$  in., 5.439c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to  $\frac{3}{4}$  x 6 in., 40-2 $\frac{1}{2}$ ; larger sizes, 30-5 hot-pressed nuts, square, \$3, and hexagon \$3 off per 100 lb.; lag screws, 50 per cent off.

## Philadelphia

PHILADELPHIA, June 25.

Additional Government orders have been received by fabricating shops in eastern Pennsylvania territory, accentuating an already tight situation with regard to structural steel. One large interest, already announced as out of the market, will take on no commitments for the remainder of this year, and export inquiries running up to 20,000 or 30,000 tons have aroused only casual interest among the Eastern mills. Offers of 7c for standard materials by foreign buyers are apparently no incentive, for, in the view of important manufacturers, indications point to a real scarcity of fabricated materials and to further price advances. Domestic inquiry shows a falling off, partly owing to price and delivery conditions and partly owing to the attitude of manufacturers, who are not eager to commit themselves until the situation at Washington assumes more definite shape and an approximate idea can be obtained as to Government requirements and conditions of manufacture and delivery. Locally the conditions in the markets for structural steel, as well as other building materials, are having a well defined effect. Warehouse space has been so generally taken up by ordinary commercial interests that the Government has been having difficulty in securing, under lease, a storage building with about 75,000 feet of floor space. Very little new storage space is now under construction



in this city, and the advances in iron and steel are given by builders as factors in this arrested development.

**Pig Iron.**—Strength and activity have been shown in the pig iron market during the week, with orders in fair volume and prices advancing. Quotations are showing an unusual spread, due to high prices, variations in analysis and range in the period of delivery. The opening of a new furnace in Virginia, with its consequent offering of iron in this market, throws a light on conditions, for the opening price of \$45 furnace rose by rapid leaps to \$50 for No. 2 X. Prices ranging from \$58 to \$62 a ton for high silicon Virginia irons have been quoted in this market. For standard Virginia No. 2 X, the minimum price seems to be \$48 furnace, and this is apparently the market basis, as it reflects the opinions of several important producers and has been established by recent transactions. Small lots of gray forge have been sold at \$49, under rather strict specification. Basic iron is still quiet, and a purely nominal quotation is \$50. Standard low phosphorus, virtually unobtainable for nearby delivery, is held at a nominal figure of \$90. Quotations for standard brands, prompt shipment and delivery in buyers' yards, range about thus:

Eastern Pa. No. 2 X foundry.....	\$50.75 to \$52.75
Eastern Pa. No. 2 plain.....	50.25 to 52.25
Virginia No. 2 X foundry.....	50.25
Virginia No. 2 plain.....	49.75
Basic.....	50.00
Gray forge.....	47.00 to 49.00
Standard low phosphorus.....	90.00

**Iron and Steel Bars.**—Bar iron is apparently firmly fixed on a basis of 4½c Pittsburgh, whether conditions be immediate business or delivery anywhere within third quarter. One considerable local interest is quoting 5c, but this figure is somewhat above the market. For steel bars, a large producer quotes 4½c Pittsburgh as the minimum, while another interest, which is out of the market on soft steel bars, is asking that price for concrete bars. The sale of some odds and ends of steel bars, which in other times would have qualified as scrap, is reported at 4c by a third mill. The market for bar iron and steel bars continues firm.

**Coke.**—Fuel conditions continue to furnish a problem to iron and steel makers. Lack of coke, and poor quality in such as did come through, are blamed for heavy reduction in tonnage at Eastern furnaces. Foundry coke is quoted today at \$12.50 to \$13 oven for spot fuel.

**Structural Material.**—Government work is interfering more and more with the schedules in structural mills, and domestic inquiries are light. Additional contracts for third quarter specification at 6c Pittsburgh are reported by one of the mills still in position to take on business, while another gives 5c as its figure for anything like early delivery, with price advances in sight. An inquiry is in this market on several hundred tons for an extension of the erecting shop in the Washington Navy Yard. The Belmont Iron Works has received the award on 2500 tons for the Baltimore Drydock & Shipbuilding Co.

**Plates.**—Manufacturers are literally being begged to sell plates, particularly by export interests to which price is of little apparent moment. Regular customers are the only ones who seem to be able to get consideration, and 10c base Pittsburgh for tank steel remains the minimum, with 12½c the bottom price for boat steel. Contracts continue to be made for third quarter only. One manufacturer reports turning down two specifications aggregating 7400 tons, besides several ranging from 1000 tons downwards. One order of 6000 tons for Italy has been going around in vain in this market, while another inquiry for 8000 tons coupled with 2500 tons of bars and angles, likewise for export, could find no taker. Japanese inquiry for ship plates and boiler steel has been noted here, but "fancy prices" said to reach 14c for boat steel have had no effect.

**Sheets.**—Capacity in Eastern sheet mills has been thoroughly pre-empted, with practically no chance for anybody to place any further orders except on Gov-

ernment account. Work of this character is likely to be placed shortly. Meanwhile 8½c Pittsburgh for No. 10 blue annealed remains the minimum for ordinary commercial business, with no sales reported this week.

**Billets.**—Forging billets continue to be held at \$125 Pittsburgh by Eastern mills, with soft open hearth billets at \$110 and no sales. Open hearth slabs are held at \$110, the price established by a sale here several weeks ago.

**Ferroalloys.**—Ferromanganese and spiegeleisen have been somewhat stronger this week, and an inquiry for several hundred tons of 11 per cent Bessemer ferro-silicon is reported. Ferromanganese remains at \$450 to \$460 for prompt, with 50 per cent ferrosilicon quoted at \$250 to \$300 for prompt.

**Old Materials.**—While there is little actual change in the old materials market, as compared with a few days ago, there is an apparent feeling of uncertainty which in some quarters takes on the idea that the crest of the present movement may have been reached. Eastern mills are still inactive in the market, and the real buying is on Pittsburgh and Ohio account. Material is still scarce, the lack of cars being a factor in this. While some handlers of scrap stick to their old policy of selling only within Eastern territory, even at prices below those offered for shipment west, sales of No. 1 heavy melting steel scrap to Eastern mills at \$40 and better have been made. However, the rapid mounting of prices which was so pronounced a week ago has not been seen this week, and a number of items in the list show no change over a week ago. Machine shop turnings for Eastern delivery sell at \$22 to \$23, and should have been so quoted last week, but for shipment to Pittsburgh \$3 more is commanded. The same is true as to cast borings. Prices to-day, based on Eastern Pennsylvania delivery, except as otherwise noted, range about thus per gross ton:

No. 1 heavy melting steel.....	\$39.00 to \$41.00
Old steel rails, rerolling.....	50.00 to 55.00
Low phosphorus heavy melting.....	56.00 to 58.00
Old iron rails.....	52.00 to 55.00
Old carwheels.....	35.00 to 37.00
No. 1 railroad wrought.....	57.00 to 59.00
No. 1 forge fire.....	26.00 to 28.00
Bundled sheets.....	26.00 to 28.00
No. 2 busheling.....	18.00 to 20.00
Machine shop turnings.....	22.00 to 23.00
Cast borings.....	22.00 to 23.00
No. 1 cast.....	39.00 to 41.00
Grate bars, railroad.....	21.00 to 22.00
Stove plate.....	21.00 to 22.00
Railroad malleable.....	32.00 to 33.00
Wrought iron and soft steel pipe (new specification).....	40.00 to 42.00

## Cleveland

CLEVELAND, June 26.

**Iron Ore.**—There is a steady demand for small lots of ore and one firm reports several sales aggregating about 100,000 tons during the week. The car situation has improved somewhat and Lake shipments have become very heavy. One of the plans that has been worked out by the iron ore shippers' clearing house to facilitate ore movement is to divide the districts among the various shippers. The shippers will pay special attention to the distribution of ore in their districts and help expedite the movement. M. A. Hanna & Co. will look after ore received at Erie and Buffalo and for shipments to eastern furnaces. Supervision of ore shipped from Cleveland to Valley and Pittsburgh consumers will be in the hands of Pickands, Mather & Co., who will look after the Erie Railroad shipments, while M. A. Hanna & Co. will oversee the Pennsylvania Railroad shipments. Oglebay, Norton & Co. will direct the movement from Toledo to southern Ohio. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

**Pig Iron.**—Inquiries are still fairly plentiful but sales have fallen off somewhat, owing largely to the fact that most producers are trying to avoid taking on much additional tonnage. A new high price for foundry iron is reported in a sale of a 300 ton lot for early shipment made by a Cleveland firm in Pittsburgh yesterday, at \$58. Lake and Valley furnaces have gen-

erally marked up prices and \$55 at furnace appears to be the ruling quotation for No. 2 foundry for any delivery before July, 1918. Several first half contracts have been taken at that price. Among the larger inquiries is one from a Cleveland district for 1000 tons of No. 1 and 1000 tons of No. 2 for the first half. Producers are asking \$53 to \$55 for basic iron and around \$58 for Bessemer iron. A southern Ohio consumer is inquiring for 5000 to 10,000 tons of basic iron for the third or fourth quarter. Southern iron is quoted as high as \$50, Birmingham, for No. 2 for the first half. An additional sale of 300 tons of Ohio silvery iron was made last week at \$70 for 8 per cent silicon and as high as \$85 is now being asked. An Ohio steel maker is inquiring for 2000 tons of silvery for prompt shipment and 3000 tons for the first quarter for use in making a special grade of steel for export. Another inquiry is for 600 tons for the third quarter delivery. A Cleveland interest has sold small lots of low phosphorus iron at \$83 and is now quoting this grade at \$85. We quote f.o.b. Cleveland, as follows:

Bessemer .....	\$55.95 to \$57.95
Basic .....	50.30 to 53.30
Northern No. 2 foundry .....	54.30 to 55.30
Southern No. 2 foundry .....	48.00 to 50.00
Gray forge .....	50.95
Ohio silvery, 8 per cent silicon .....	71.62 to 81.62
Standard low phos., Valley furnace ..	83.00 to 85.00

**Coke.**—Owing to the fact that few producers are willing to make contracts at stated prices, many of the foundry coke consumers are entering into contracts with producers for specified tonnages for weekly delivery, agreeing to pay the price prevailing at the time of shipment. This assures the consumers a supply of coke and they can terminate these agreements at any time. This cancellation clause will permit them to make contracts at lower prices, should they be able to do so. For prompt shipment standard Connellsville foundry coke is quoted at \$12.50 per net ton, and furnace coke at \$12 to \$12.50 per net ton at oven.

**Finished Iron and Steel.**—Inquiries for steel for Government work are coming out in increasing volume, but outside of contracts involving small lots of steel the orders have not been definitely given and the placing of the steel is being held up for this reason. In some cases protection has been given on steel for Government work. Three automobile plants in the Central West—the Willys-Overland, Cadillac and Packard—are understood to be making aeroplane motors, and some other aeroplane work has been placed. Inquiry for steel for purposes not required directly or indirectly by the Government is light and mills generally are avoiding taking orders as much as possible, reserving their capacity for the Government. One Pittsburgh district mill that opened its books a few days ago for a third quarter contract has closed with much of its regular trade for that delivery at 10c. for plates, 6c. for structural and 4.50c. for bars. A Cleveland mill has advanced its plate prices and is now quoting 10c. to 12.50c., Pittsburgh, for tank plates and is booking orders at the maximum price. Some of the mills are no longer quoting prices on hard steel bars because they are unable to get old rails. Hard steel is now quoted at 4c. for reinforcing bars and 4.25c. for implement bars. The high price of scrap has nearly driven the bar iron mills out of the market, and when quotations are made they are on the basis of 5c., Pittsburgh. The demand for sheets continues very heavy and round tonnage sales are reported at 8.50c. for No. 28 box annealed and No. 10 blue annealed, and 10.50c. for No. 28 galvanized. In spite of the slowing down of the passenger automobile trade there is a heavy demand from these works for finished sheets, which are scarce, and some consumers have not yet covered with last half contracts. Warehouse prices are unchanged at 5c. for steel bars, 5.25c. for structural material, 9c. for plates and 8c. for blue annealed sheets.

**Bolts, Nuts and Rivets.**—A leading Cleveland bolt and nut manufacturer advanced prices June 20 about 10 per cent. Some of the other Cleveland makers have made corresponding advances. The demand is very heavy from the implement trade, railroads and jobbers. Manufacturers are trying to avoid making contracts as

much as possible and are taking orders for shipment as soon as deliveries can be made, which is within three or four months. Considerable business is being placed directly to meet Government requirements, but no arrangement has been made as yet on prices for direct Government orders. Cleveland rivet manufacturers have advanced prices for the fourth quarter delivery to 5.25c. for structural rivets and 5.35c., Pittsburgh, for boiler rivets to conform with the price advances made by Pittsburgh manufacturers a week ago, but are still quoting old prices, 4.90c. for structural rivets and 5c. for boiler rivets for the third quarter delivery. These prices, however, are likely to be withdrawn any day. The placing of large orders by the Government is still pending, and it is probable that a price arrangement will be entered into on a conversion basis. Bolt and nut discounts are as follows:

Common carriage bolts,  $\frac{3}{4}$  x 6 in., smaller or shorter, rolled thread, 35 off; cut thread, 30 and 5; larger or longer, 20. Machine bolts, with h. p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 40; cut thread, 35; larger and longer, 25. Lag bolts, cone point, 40. Square h. p. nuts, blank, \$1.90 off list; tapped, \$1.70 off list. Hexagon, h. p. nuts, blank, \$1.70 off; tapped, \$1.50 off. C. p. c. and t. hexagon nuts, all sizes blank, \$1.25 off; tapped, \$1 off. Cold pressed semi-finished hexagon nuts, 50 and 5 off.

**Old Material.**—The market continues very active, with prices unsettled and still showing an upward tendency. There is a wide spread in prices paid by dealers who are still covering on short sales. Sales of round tonnages of heavy melting steel scrap are reported to Cleveland and Valley mills. There is a good demand for borings and turnings in the Pittsburgh district. A sale of 1000 tons of heavy melting steel scrap is reported at \$47.50 for delivery at Monessen and round lot sales have been made at \$46.50 to Massillon and other Ohio mills and at \$45 to \$46 to Cleveland mills. Steel carwheels have sold at \$53.50 and iron at \$40, gross. Dealers have paid from \$28 to \$35 for No. 1 busheling, and a sale of this grade to a mill is reported at \$37.50. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Steel rails .....	\$44.00 to \$45.00
Steel rails, rerolling .....	48.00 to 50.00
Steel rails, under 3 ft. ....	47.00 to 50.00
Iron rails .....	44.00 to 45.00
Steel car axles .....	55.00 to 57.50
Heavy melting steel .....	43.00 to 45.00
Carwheels .....	40.00 to 41.00
Relaying rails, 50 lb. and over ..	50.00 to 55.00
Agricultural malleable .....	29.00 to 31.00
Railroad malleable .....	42.00 to 44.00
Light bundled sheet scrap .....	24.00 to 25.00

Per Net Ton	
Iron car axles .....	\$55.00 to \$60.00
Cast borings .....	21.00 to 22.00
Iron and steel turnings and drillings ..	20.50 to 21.00
No. 1 busheling (nominal) .....	30.00 to 32.00
No. 1 railroad wrought .....	44.00 to 45.00
No. 1 cast .....	33.00 to 35.00
Railroad grate bars .....	21.50 to 22.50
Stove plate .....	21.00 to 22.00

## Birmingham

BIRMINGHAM, June 27.—(By Wire.)

**Pig Iron.**—On Monday the leading sellers of foundry iron marked up 1918 delivery iron to \$45, an advance of \$3. This is also its minimum for 1917. Other prominent interests had not by Tuesday advanced beyond \$42.50 for 1918, but sales had been made at \$43, and all will doubtless advance forthwith. A last quarter sale for Central Western delivery brought \$46. Spot iron in some cases has sold at \$46.50 to \$51. No one quotes spot prices except on inquiry. Nothing less than \$46.50 has been done in the past few days. Each advance seems to render consumers more anxious to buy for 1918 delivery.

(By Mail)

The spot market is anyone's. The one assured thing at the close of the week ending June 23 was that \$45 was the minimum of furnace iron, with almost none obtainable, as all makers are behind on deliveries owing to car shortage. A man desiring 30 tons of rush iron and trading through a broker was asked \$51. It is understood that the deal was made. This was exceptional, but at the time of occurrence was liable

to duplication at any time. The Matthews Iron & Mining Co., Rome, Ga., after many months of preparation, lighted fires in its Silver Run furnace at that place June 21. The consummation of the deal, by which this company also acquired the properties of the Dayton, Tenn., Coal & Iron Co., took place about the same time. The output of the furnace is understood to be contracted for for some time to come. The Shelby Iron Co. expects to blow in a charcoal stack on foundry iron soon after July 1. We quote for prompt delivery per gross ton f. o. b. Birmingham furnace yards minimum price as follows:

No. 1 foundry and soft.....	\$45.50 to \$47.50
No. 2 foundry and soft.....	45.00 to 47.00
No. 3 foundry.....	44.50 to 46.50
No. 4 foundry.....	44.25 to 46.25
Gray forge.....	44.00 to 46.00
Basic.....	48.00 to 50.00
Charcoal.....	50.00 to 52.00

**Cast Iron Pipe.**—Cast iron pipe has gone up \$2 per ton. Practically all Southern shops are sharing in the Government cantonment business. Orders have been given for Louisville and Columbia, S. C., as well as Chattanooga and some other points. Some concessions were made the Government, it is understood. Columbia takes ten miles of 16-in. pipe. We quote per net ton f. o. b. Birmingham pipe shop yards as follows: 4 in., \$58; 6 in. and upwards, \$55, with \$1 added for gas pipe and extra lengths.

**Coal and Coke.**—Standard beehive foundry coke sells at \$12.50 to \$15, according to whether it is contract or spot. Milling coal brings \$2.50 to \$3.50; blacksmithing coal, \$5 to \$6. Furnace coke is sold at \$6 to \$8 per ton. Car shortage is still badly felt.

**Old Material.**—Scrap dealers have discovered the full value of the materials handled by them following a tremendous demand from the East, which, supplemented by the local requirements, led to the heaviest week in the history of the Birmingham dealers. Buyers paid as many as 10 different prices for the same material, with a range of \$10 to \$12 per ton. Dealers did not know from day to day what to charge and frequently discovered, a few hours after making a trade, that much more might have been gotten. By the close of the week ending June 24 prices were nearer on a general basis with all and settled down at the maximum. We quote per gross ton f. o. b. Birmingham pipe shop yards as follows:

Old steel axes.....	\$50.00 to \$55.00
Old steel rails.....	37.00 to 40.00
No. 1 wrought.....	35.00 to 40.00
No. 1 heavy melting steel.....	25.00 to 27.00
No. 1 machinery cast.....	27.00 to 28.00
Carwheels.....	27.00 to 29.00
Tram carwheels.....	25.00 to 30.00
Stove plate and light.....	19.00 to 20.00
Turnings.....	13.00 to 14.00

**Steel Bars.**—Steel bars in carload lots f. o. b. Birmingham made another advance and are now quoted at 4.50c. to 4.75c.; iron bars, 4.30c. to 4.40c.

## St. Louis

ST. LOUIS, June 25.

**Pig Iron.**—Buying of pig iron has settled down, apparently, to specific needs, so far as the melters of this section are concerned, and purchases are being made in small lots for the 1918 deliveries at the advanced prices. There is also some effort on the part of a few buyers to place contracts for 1919 delivery, but the furnaces are not willing to consider these or to make prices for such delivery. The one large item in the market is an inquiry for 5000 to 10,000 tons of basic for export to Japan, and it is understood that the local furnace has made a price to the seller approximating \$62 per ton. Purchases during the week totalled about 2500 tons in small lots, mostly for 1918 delivery, there being nothing available for 1917. The value at which pig iron is being held varies widely with No. 2 Southern foundry approximately at \$45 Birmingham for 1918 delivery, and last quarter 1917 at \$50. The local furnace is making its first half 1918 price at \$55, with the last half of 1917 at \$60 per ton. Chicago No. 2X foundry is held at \$55 to \$56 any delivery, and No. 2 Northern, Ironton basis, \$55 for last

quarter and \$50 to \$53 for first half of 1918. These, however, are but approximate figures, everything going up to the furnace for approval.

**Coke.**—An inquiry for 10,000 tons of smelter coke appeared in the market, but has not been closed, the price being in negotiation between the bidding representatives and their ovens. At the present time 72-hour foundry coke, Connellsville, is held here at \$12.50 to \$13, ovens, while furnace coke is at approximately the same figures. The local by-product coke is not available because of contracts, and nearby producers are not in the market here.

**Finished Iron and Steel.**—In finished products the market has been, so far as new contracts are concerned, non-existent. Very little buying is being permitted by the representatives of the mills, who have orders to discourage consumers for the present because of the imperative demands elsewhere. Movement out of warehouse is well beyond the ability of the warehousemen to handle. We quote for stock out of warehouse as follows: Soft steel bars, 4.55c.; iron bars, 4.50c.; structural material, 5.05c.; tank plates, 8.05c.; No. 10 blue annealed sheets, 9.55c.; No. 28 black sheets, cold rolled, one pass, 8.85c.; No. 28 galvanized sheets, black sheet gage, 11.25c.

**Old Material.**—In the scrap market during the earlier part of last week there was a very sharp upward trend because of the excited conditions prevailing, and the figures were moved up spasmodically and apparently without any good reason therefor. After being pegged pretty well up for the most of the week, there was a weakening tendency, and to-day prices are being put \$2 to \$3 per ton lower than the peak of the high spell of last week. There is a feeling that the prices have gone too far upward, and dealers are beginning to review the situation more carefully. Consuming interests are buying still when the prices suit them, but they are not bidding up the market in any way. In addition to this, the railroads are beginning to show a disposition to take advantage of the prices prevailing and the lists coming out are having their effect also on the market. Lists out during the week included about 10,000 tons from the Baltimore & Ohio, 2000 tons from the St. Joseph & Grand Island, 3000 tons from the Burlington, 1000 tons from the Wabash, and a number of smaller lists from other roads in this territory. We quote dealers' prices, f. o. b. consumers' works, St. Louis industrial district, as follows:

### Per Gross Ton

Old iron rails.....	\$44.00 to \$45.00
Old steel rails, re-rolling.....	45.00 to 46.50
Old steel rails, less than 3 feet.....	44.50 to 45.00
Relaying rails, standard section, subject to inspection.....	50.00 to 55.00
Old car wheels.....	40.00 to 41.00
No. 1 Railroad heavy melting steel scrap.....	42.00 to 43.00
Heavy shoveling steel.....	38.50 to 39.00
Ordinary shoveling steel.....	35.50 to 36.50
Frogs, switches and guards cut apart.....	42.00 to 43.00
Ordinary bundled sheet scrap.....	23.50 to 24.00
Heavy axle and tire turnings.....	21.00 to 22.00

### Per Net Ton

Iron angle bars.....	\$39.00 to \$40.00
Steel angle bars.....	39.50 to 40.00
Iron car axles.....	49.00 to 50.00
Steel car axles.....	47.50 to 48.00
Wrought arch bars and transoms.....	44.00 to 45.00
No. 1 railroad wrought.....	43.50 to 44.00
No. 2 railroad wrought.....	40.00 to 41.00
Railroad springs.....	40.50 to 41.00
Steel couplers and knuckles.....	40.50 to 41.00
Locomotive tires, 42 in. and over, smooth inside.....	48.50 to 49.00
No. 1 dealers' forge.....	36.00 to 37.00
Cast iron borings.....	20.00 to 20.50
No. 1 busheling.....	31.00 to 31.50
No. 1 boilers, cut to sheets and rings.....	24.50 to 25.00
No. 1 railroad cast scrap.....	32.00 to 33.00
Stove plate and light cast scrap.....	22.00 to 23.00
Railroad malleable.....	31.00 to 32.00
Agricultural malleable.....	25.00 to 26.00
Pipes and flues.....	28.00 to 29.00
Railroad sheet and tank scrap.....	27.00 to 28.00
Railroad grate bars.....	22.50 to 23.00
Machine shop turnings.....	21.00 to 21.50

The Eastern Steel Co., which for a year has been pumping out the old ore mines at Boyertown, Berks County, and making other repairs, will discontinue work June 30. It is said that the company will not avail itself of the option to buy the property.



## British Steel Market

### Ferromanganese Advancing and Being Made in Australia—Tin Plate Strong

(By Cable)

LONDON, ENGLAND, June 27.

The Cleveland pig-iron market is quiet but there is a heavy demand for hematite iron. Tin plates are firm and business is more difficult, demand exceeding the supply. Black sheets are £21 5s. and semi-finished steel is idle. Ferromanganese is strong and nominal with licenses issued chiefly for the United States. On inquiries from the continent £66 has been bid f.o.b. last quarter. For delivery in America in the first quarter of 1918, \$350 has been paid. Australia has been making some offers of ferromanganese. We quote as follows:

Tin plates, coke 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 35s.

Black sheets, £21 5s.

Ferromanganese, £45 nominal.

Ferrosilicon, 50 per cent, c.i.f., £35 upward.

### Large New Steel Plant—Welsh Tin-Plate Conditions Acute

LONDON, ENGLAND, June 5. (By Mail)

The necessity of speeding up deliveries of iron and steel has become more urgent, and heavy arrears have yet to be grappled with. The demand for steel does not slacken, but new business is extremely restricted, especially in finished material. Labor in the various districts continues to dwindle owing to enlistment, and the mills have many difficulties to overcome.

There is no change in pig iron, which in the Midlands is rather uncertain, the authorities still being reticent as to applications from furnace owners for a revision of maximum prices. Some producers still hope that their representations will be acceded to, though the delay in reaching a decision is vexatious. There has been more life in Cleveland foundry grades, deliveries to home consumers in the last month having been pretty full, while the June allocations are very liberal. There is an unabated big home consumption, and exports are light, although an increase is likely, since tonnage is coming to hand more regularly. Demand for hematite has been intensified lately, but makers on the East Coast are so fully booked that the negotiation of new orders is restricted, and deliveries against old contracts are considerably behindhand. Consumers' needs are growing, and export allocations have to be kept down, while producers are holding back until the question of a revision of export prices has been settled. The total shipments from the Tees during the last month amounted to 59,915 tons, an increase over the previous month of 22,618 tons.

Semi-finished steel remains unchanged. There is no abatement in the stringency, practically the whole of the output being allocated for government work. Deliveries to the tin-plate mills are in arrears. American material has remained a dead letter, billets being quite nominal in the absence of offers, while only limited quantities of wire rods are occasionally to be picked up at about £28 c.i.f. home ports, though in some quarters much more is asked.

In finished steel the congestion of orders is as intense as ever, with no hope of relief for months to come. Where attempts are made to place new business not directly connected with war work very little material is obtainable, and excessive premiums are secured for material free from price control. Shipbuilding requirements continue very heavy.

#### New Steel Plant

The Tees Conservancy Commissioners have transferred 21 acres of river frontage at Stockton-on-Tees to the East Coast Steel Corporation, which needs the frontage for the erection of works which will cost three millions sterling.

The outlook in the Welsh tin-plate industry has grown more acute. The supply of raw materials is

about as unsatisfactory as it can be, while sulphuric acid has now been placed under control. With the demand more insistent, and makers already booked months ahead, prices have obviously advanced further, and may be expected to continue, the market being bare of offers. All indications point to a growing shortage. Current quotations for government work range from about 34s. upward, f.o.b. basis.

There is still no reliable export quotations obtainable for ferromanganese. There are practically no sellers, the market being quite nominal. All kinds of f.o.b. prices are spoken of, from £45 upward.

## Buffalo

BUFFALO, June 25.

**Pig Iron.**—Although it is probable the majority of consumers are fairly well covered for their needs for the remainder of the year, inquiry keeps coming in, both for last half of the current year and first half of next. Would-be purchasers, however, are unable to obtain iron except to an extremely limited extent, not over 25 to 30 per cent of the requirements asked for. The total of orders taken does not exceed 7000 tons. Such buying as has been effected was almost entirely for first quarter and first half of 1918, as there is little or no 1917 iron remaining available from Buffalo furnaces. Prices continue to advance, and \$2 to \$3 per ton will not more than cover the week's increase. No. 1 foundry, malleable and basic are now held at \$53 to \$55; higher silicons \$54 to \$56 and No. 2 X foundry at \$52 to \$54. Even the lower grades command \$50 to \$51 at furnace. We quote as follows for first quarter and half, 1918, and such small amounts of 1917 iron as are available:

High silicon irons	.....	\$54.00 to \$56.00
No. 1 foundry	.....	53.00 to 55.00
No. 2 X foundry	.....	52.00 to 54.00
No. 2 plain	.....	51.00 to 52.00
No. 3 foundry	.....	50.00 to 51.00
Gray forge	.....	50.00 to 51.00
Malleable	.....	53.00 to 55.00
Basic	.....	53.00 to 55.00
Lake Superior charcoal, f.o.b. Buffalo	.....	55.00 to 60.00

**Old Material.**—Material is so closely taken up that there does not appear to be any limit in the way of price that cannot be secured for scrap on which immediate delivery can be guaranteed. Consequently there is a lack of solid foundation on which to base a really accurate schedule of prices. Nearly all dealers are loaded with orders taken at much lower than current prices and there appears to be a tendency to some extent to hold back delivery on such orders at the old figures. This is bringing about a serious situation and has resulted in three or four independent investigations to obtain necessary evidence to prove defaults in shipments due from dealers which it is claimed have been diverted to higher priced orders, and action on these investigations will be closely watched. Most dealers, however, are applying such material as they can accumulate on their old contracts and cleaning them up before making further sales, but are unable to guarantee delivery of any tonnage within a specified time. High prices are now checking trading and the result may be that prices will settle back to a lower level. The shortage in labor and in cars continues serious. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	.....	\$42.00 to \$43.00
Low phosphorus	.....	55.00 to 60.00
No. 1 railroad wrought	.....	50.00 to 55.00
No. 1 railroad and machinery cast	.....	33.00 to 34.00
Iron axles	.....	55.00 to 60.00
Steel axles	.....	55.00 to 60.00
Carwheels	.....	38.00 to 40.00
Railroad malleable	.....	35.00 to 36.00
Machine shop turnings	.....	21.00 to 22.00
Heavy axle turnings	.....	26.00 to 27.00
Clean cast borings	.....	21.00 to 22.00
Iron rails	.....	45.00 to 46.00
Locomotive grate bars	.....	23.00 to 24.00
Stove plate	.....	23.00 to 24.00
Wrought pipe	.....	35.00 to 36.00
No. 1 busheling scrap	.....	32.00 to 34.00
No. 2 busheling scrap	.....	21.00 to 22.00
Bundled sheet stamping scrap	.....	22.00 to 23.00

**Finished Iron and Steel.**—There are growing indications that because of scarcity of pig metal and heavy

melting scrap the output of most of the large steel companies will be less during the last half of the year than for the first half, which is resulting in a sharp curtailment of all sales. Nearly all inquiries are being turned down, and such inquiries as are being entertained cover only restricted sizes and that type of material which can be shipped during the remainder of the year. The demand for sheets, both black, blue annealed and galvanized, is very heavy and prices exceedingly firm, with advancing tendency.

## Cincinnati

CINCINNATI, June 27—(By Wire).

**Pig Iron.**—It is reported that a round tonnage of Southern basic was sold in St. Louis territory at \$50, Birmingham, for first half shipment. It is understood that a small part of this tonnage will be delivered in the last quarter of this year. A Virginia furnace has opened its books for a limited tonnage of No. 2 plain, which is offered at \$50, furnace, for first half shipment. This figure could probably be shaded on firm offers for shipment during the remainder of this year. Prices in all districts are still on the up grade and to-day's quotation by a number of Southern furnaces is \$50, Birmingham, for shipment this year or the first half of 1918. Very little foundry iron has been sold at this price, but a number of contracts have been made in southern and central Ohio, Indiana and Michigan at \$46 to \$48 and in a few instances first half contracts were made at the last named figure. A local melter purchased last week 800 tons of Southern foundry, 500 Virginia and about 300 Northern, all for first half shipment. Southern Ohio furnaces are short of iron for this year and name \$55, Ironton, for that delivery and from \$51 to \$55 for the first half of next year. A large percentage of inquiries now received is over the telephone and in a number of instances offers submitted are accepted subject to confirmation by the furnaces. All kinds of prices are made on high silicon irons and a small tonnage on 8 per cent Ohio silvery has brought \$85, furnace, for this year's shipment. However, the furnaces are openly quoting on only first half delivery and quotations range from \$70 to \$80. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$49.40 to \$50.40
Southern coke, No. 2 f'dry and 2 soft.	47.90 to 49.90
Southern coke, No. 3 foundry.	48.40 to 49.40
Southern coke, No. 4 foundry.	48.00 to 49.00
Southern gray forge	46.90 to 47.90
Ohio silvery, 8 per cent silicon.	71.26
Southern Ohio coke, No. 1.	56.76
Southern Ohio coke, No. 2.	56.26
Southern Ohio coke, No. 3.	55.76
Southern Ohio malleable Bessemer.	56.26
Basic, Northern	56.26
Lake Superior charcoal.	54.75
Southern carwheel foundry.	48.90

(By Mail)

**Coke.**—Reports from nearly all producing districts show that coke is getting scarcer and that prompt shipments are more difficult to make. Very little, if any, furnace coke has been sold for future shipment lately and foundry coke contracting is confined to nearby delivery. In a number of cases stiff prices have been obtained for both furnace and foundry coke that was loaded on cars and which could be diverted. The car shortage is still serious and there is no early relief in sight. We quote 48-hr. coke in the Connellsville district at \$9.50 to \$11 per net ton at oven and 72-hr. coke from \$11.50 to \$12.50. Wise County and New River prices are about the same, but Pocahontas quotations are not quite as firm. In all four fields mentioned, as high as \$13 per net ton has lately been obtained for foundry coke that could be moved promptly.

**Finished Material.**—The local jobbers are able to make fairly satisfactory deliveries on nearly all orders received, although this necessitates splitting up orders frequently and distributing different kinds of finished material among different customers. Plates  $\frac{1}{4}$  in. and heavier are unchanged at 9c.; structural shapes, 5c.; steel bars, 4.65c.; twisted steel bars, 4.70c., and blue

annealed sheets, 9c. The nearby mills quote No. 28 black sheets at 8.15c., Cincinnati or Newport, Ky., and No. 28 galvanized sheets at 10.15c. Machine shop supplies are in better demand, but prices remain the same. Machine bolts  $\frac{3}{4}$  x 4 in. and smaller take a 45 per cent discount; larger and longer, 30 per cent; files, 50 per cent discount; hacksaws, 10 per cent discount, and hand taps, 55 and  $7\frac{1}{2}$  per cent discount.

**Old Material.**—The market is not quite as strong as it was last week and nearly all prices have been scaled down, some as much as \$1 a ton. No definite reason is assigned for this weakness and it certainly is not due to any increase in stocks nor to any decrease in the demand for scrap. The following are dealers' prices, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	\$23.50 to \$24.00
Old iron rails	40.00 to 40.50
Relaying rails, 50 lb. and up.	45.50 to 46.00
Revolving steel rails	42.50 to 43.00
Heavy melting steel scrap	40.00 to 40.50
Steel rails for melting	40.00 to 40.50
Old carwheels	36.50 to 37.00
Per Net Ton	
No. 1 railroad wrought	\$38.50 to \$39.00
Cast borings	13.50 to 14.00
Steel turnings	13.50 to 14.00
Railroad cast	28.00 to 28.50
No. 1 machinery cast	29.50 to 30.00
Burnt scrap	17.00 to 17.50
Iron axles	47.50 to 48.00
Locomotive tires (smooth inside)	42.00 to 42.50
Pipes and flues	23.00 to 23.50
Malleable cast	27.50 to 28.00
Railroad tank and sheet	20.50 to 21.00

## New York

NEW YORK, June 27.

**Pig Iron.**—Uncertainty as to the Government's position in regard to fixing the prices for various products is apparently having some effect in causing caution on the part of buyers of pig iron for delivery next year, but there is no diminution in interest in this year's market and prices are higher. A New Jersey buyer has closed on its inquiry for 5000 tons of basic and is understood to have paid about \$54, delivered. The iron was lower in phosphorus than can be made by any nearby furnace and a rather heavy freight rate was involved. It is doubtful whether \$50 eastern Pennsylvania furnace can be done on basic for delivery this year. Some furnaces are quoting as high as \$52. A New Jersey stove company has purchased 1500 tons of No. 2 foundry iron for the first half of next year at about \$50, furnace. Very little Buffalo iron is obtainable for this year's delivery and sales have been made as high as \$52, furnace. Virginia iron is considerably higher. The leading Virginia interest, which had temporarily withdrawn from the market, sold this week a limited tonnage for first half at the following schedule, furnace: No. 1 soft, \$53; No. 1 foundry, \$51.50; No. 2X, \$50; No. 2 plain, \$49.75; No. 3, \$49.50; lower grades, \$49.25. The company then again withdrew. Charcoal iron is quoted at \$61.84, Buffalo, or \$64.42 at Eastern points for this year, and \$2.50 less for next year. The car situation is very serious, especially along the New Haven line in New England, and deliveries are extremely uncertain. There is also much complaint being made in regard to slow deliveries of Alabama iron. We quote tidewater for early deliveries as follows:

No. 1 foundry	\$50.25 to \$51.25
No. 2 X	49.75 to 50.75
No. 2 plain	49.25 to 50.25
Southern No. 1 foundry	49.75
Southern No. 2 foundry and soft	49.25

**Steel Plates.**—Considerable additional tonnage for steel plates has been placed by Japanese shipbuilding concerns. On Tuesday it was said that about 40,000 to 50,000 tons remained to be placed if mills could be found to accept the business. The Japanese are continuing to buy tank plates for ships. It is understood that they are using ship plates of Lloyd's specifications for ocean-going craft and tank plates for coastwise vessels. Ships constructed of tank plates take a higher

rate of insurance. A firm offer of 9.90c. for 1000 tons of tank plates, Aug. 1 shipment to Japan, was declined by one mill. A 5000-ton order for tank plates at 9.75c. for later delivery was under consideration by another mill. Most of the large mills are out of the market, having on their books now all of the future business that they care to accept, in view of the uncertainty as to the Government requirements. Boiler plates of Lloyd's specifications are in great demand, but are hard to find at any price. A sale of 1000 tons of ship plates at 10.75c. is noted. This price probably now represents the minimum. Two lots for export to Japan were sold at 10.85c. and 11c. Some mills are now asking 12c. to 12½c. Mills are now receiving specifications from the Government for shrapnel steel to be shipped to various plants which are engaged in munition making. There is no change in the car situation and probably will be none until the question of whether the Government is to carry out its proposed plan to buy 100,000 cars is definitely settled. On mill shipments of universal and tank plates the range is 9.919c. to 10.169c., New York, and ship plates, 10.919c. to 12.169c. Plates out of store are 9c. to 9.50c., New York.

**Iron and Steel Bars.**—For delivery in 60 to 90 days a leading producer is quoting on the firm basis of 4.50c., Pittsburgh, for bar iron. Smaller mills are willing to sell at 4.25c., Pittsburgh. Even as low as 4c. may still be done. There is an excellent export demand for both iron and steel bars. South American and West Indian countries are large purchasers. We quote steel bars in mill shipments at 4.419c. to 4.669c., New York, and iron bars at 4.419c. to 4.669c., New York. From New York district warehouses iron bars are sold at 4.75c. and steel bars at 4.75c. to 5c.

**Structural Material.**—An idea of the price situation and the extent to which it is influencing general business is conveyed by several recent examples. The cost of a small job for one of the large railroads is reported to have been 13c. per lb. erected, and on a recent bid for an undertaking of fair sized dimensions the quotation for the material necessary was 9½c. fabricated, with probably 8c. per lb. as a fair average. It now develops that some of the mills are at present quoting as high as 5c. per lb., Pittsburgh, on fairly early deliveries, this price being as high or higher than some of the warehouse prices in this district. Because of high prices and the fear that the Government may at any time demand steel under contract, new building enterprises of a general character have fallen off almost entirely. One fabricator states, however, that the number of companies inquiring for steel for additions to plants, some of them involving as high as 500 tons, is surprisingly large and in most cases necessitated by an increase in business for the Government. It is also stated that present conditions may result before long in an embargo upon domestic business. New inquiries are very scarce even for Government work, the only ones reported being 1300 tons for dock construction at Norfolk, Va., 200 tons for a movable dam for the New York State Barge Canal at Herkimer and 600 tons for bridges for the Chesapeake & Ohio, bids on which were to go in June 25. The only contracts reported as awarded involve 1000 tons for crane runways for Chester Shipbuilding Co., Chester, Pa., taken by Levering & Garrigues, and 1000 tons for the Government arsenal at Watertown, Mass., to be furnished by the Ferguson Steel & Iron Co. We quote plain material from mill at 4.419c. to 4.919c., New York, the lower price in three to four months and the higher for small lots in earlier deliveries. Shipments from warehouses are 5c. to 5.25c. per pound, New York.

**Ferroalloys.**—Buying of ferromanganese for 1918 has already appeared. Sales of lots of several hundred tons of domestic alloy have been made for delivery throughout next year at \$350, delivered, and for delivery in the first half at \$375, and, based upon these sales, these prices may be regarded as present quotations for such deliveries. For delivery this year \$400 to \$450, delivered, is quoted. One representative of British producers has made a sale of several hundred tons for delivery in the first quarter at \$350, but there

is very little of the foreign alloy available. Reports furnished THE IRON AGE from all of the receiving ports of the country except one indicate that the imports of ferromanganese in May did not exceed 2750 tons, which is one of the lowest months recorded since the war started. Imports in June are reported as fairly good, and it is expected that they will exceed those for May despite the sinking of 1000 tons early this month. The Sylvania, which was sunk within the last week, had 25 tons for one importer, and it is not known yet whether more of the alloy was consigned to other parties in this cargo. New inquiries are not large and there have been but few sales of any consequence. A large steel casting producer recently inquired for a substantial amount, but withdrew from the market. Spiegeleisen is quiet at \$80 to \$85, furnace, for the 20 per cent grade for delivery this year. Ferrosilicon, 50 per cent, is obtainable for this year's delivery for \$200 to \$225, delivered, while material for delivery in the first half of 1918 can be secured at \$130.

**Cast Iron Pipe.**—It is expected that the shops in this district will furnish the cast iron pipe for the cantonment on Long Island, but no definite advice has as yet been received from the Government. Pipe has again been advanced, being marked up \$5 per ton this time. Carload lots of 6 to 10 in. and heavier are now quoted at \$65.60 per net ton, tidewater, and 4 in. is quoted \$68.50.

**Old Material.**—Interest during the past few days has centered in heavy melting steel. Reports of a softening market at Pittsburgh and withdrawal of the Carnegie Steel Co. from the market in that city resulted in some brokers reducing their quotations about \$4 per ton, but others continued to quote the same as last week and the reports of a slump were not confirmed in Pittsburgh. There was a general feeling of anxiety with regard to steel scrap. Wrought iron scrap, however, holds its own well. For borings and turnings there is a very fair demand. Brokers quote buying prices as follows to local dealers and producers, per gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania).....	\$29.00 to \$30.00
Old steel rails (short lengths) or equivalent heavy steel scrap.....	38.00 to 40.00
Relaying rails .....	60.00 to 65.00
Rerolling rails .....	44.00 to 45.00
Iron and steel car axles .....	54.00 to 55.00
No. 1 railroad wrought.....	50.00 to 51.00
Wrought-iron track scrap.....	46.00 to 47.00
No. 1 yard wrought, long.....	42.00 to 43.00
Light iron .....	14.00 to 15.00
Cast borings (clean) .....	22.00 to 23.00
Machine-shop turnings .....	21.50 to 22.00
Mixed borings and turnings .....	18.00 to 18.50
Wrought-iron pipe (1 in. min. diameter, not under 2 ft. long).....	36.00 to 37.00

The foundry scrap market is very active and reports of some concessions are heard, but for the most part the prices are well maintained. Dealers in New York City and Brooklyn are quoting as follows to local foundries, per gross ton, New York:

No. 1 machinery cast .....	\$35.00 to \$36.00
No. 1 heavy cast (column, building material, etc.) .....	34.00 to 35.00
No. 2 cast (radiators, cast boilers, etc.) .....	29.00 to 30.00
Stove plate .....	22.00 to 23.00
Locomotive grate bars .....	22.00 to 23.00
Old carwheels .....	35.00 to 36.00
Malleable cast (railroad) .....	32.00 to 33.00

### Improvements at Baldwin Locomotive Works

The new dock of the Baldwin Locomotive Works at Eddystone was put into commission this week, when 11 locomotives, part of an order of 150 ordered by the Paris-Lyons Railway, were loaded on the Swedish ship Ellen and bedded in coal. The Baldwin Works has purchased two additional tracts of more than 100 acres each, giving it the entire Delaware water front from the original Eddystone property to Darby Creek. The investment is said to be more than \$750,000, and the company is understood to be contemplating developments in the way of additional docking space and in dredging Crum Creek, which crosses the property, to a depth of 25 feet. The proposed program will require an estimated expenditure of \$15,000,000.



## Metal Markets

### The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin, Electro- lytic	New York	Lead, New York	St. Louis	Spelter, New York	St. Louis
June	Lake						
20.....	32.50	32.50	63.75	11.70	11.50	9.62½	9.37½
21.....	32.50	32.50	63.75	11.70	11.50	9.62½	9.37½
22.....	32.50	32.50	63.00	11.70	11.50	9.50	9.25
23.....	32.50	32.50	...	11.70	11.50	9.50	9.25
25.....	32.50	32.50	62.50	11.70	11.50	9.37½	9.12½
26.....	32.50	32.50	62.00	11.70	11.50	9.37½	9.12½

NEW YORK, June 27.

Unusual inactivity characterizes all the metals. Sales of copper are very few and prices are nominal. Tin shows a little more activity but is lower. Lead is declining slightly but is fairly strong. Spelter is almost stagnant and is lower. Antimony is inactive and unchanged.

#### New York

**Copper.**—The copper market could scarcely be more inactive, due almost entirely to the continued uncertainty as to the Government's position regarding the amount of copper that will be needed for its own use and that of its allies, as well as the price. There is undoubtedly a decided hitch in negotiations at Washington and the whole matter is holding up business and will continue to do so until some definite conclusion is reached. In addition to this unsettling factor, reports are current that some large brass mills have shut down indefinitely. In general sales are very light and the market is stale and drifting. Consumers will not buy copper under present conditions and consequently the quoted prices are almost entirely nominal even for positions as far forward as late in the year. The quotation for Lake and electrolytic copper yesterday at New York was nominally 32.50c., but this could probably be shaded. For July about 31.50c. to 32c. is the quotation, with 30.50c. for the third quarter and 29c. to 29.50c. for the fourth quarter. Exports of copper for the month of May are 45,241 tons, bringing the total for the first four months of this year to nearly 226,000 tons, the largest ever recorded. There is no change in the London price for spot electrolytic, which is £142.

**Tin.**—The market is featureless and there is a decided lack of business resulting in complaints and dissatisfaction among dealers and importers. The appearance of considerable Chinese tin is acting as an unsettling influence. The publication of the personnel of the tin committee, which was appointed by the American Iron and Steel Institute and approved and confirmed by Government authorities, has not met with approbation among importers and dealers, made up as it is almost entirely of representatives of consuming interests. Late last week there were a few sales of Banca and off-grade tin mostly for future delivery. Early this week more activity was manifest and on Monday and Tuesday probably 400 to 500 tons changed hands, mostly for future delivery. Because of the arrival yesterday of over 300 tons from London the spot market fell to 62c., New York. Arrivals up to and including June 26 were 1225 tons, with the quantity afloat 3081 tons. The London price on June 25 for spot Straits was £243 15s., a decline of about £3 from that of June 22.

**Lead.**—Interest the past week centered in the announcement published in THE IRON AGE last week, that the Government has arranged to purchase its July requirements for lead, amounting to about 8000 tons, at 8c. per lb., St. Louis. While this amount was smaller than was expected, it has tended to ease to some extent the strained situation, and as a result some producers and dealers had metal left over which was offered for sale. Demand, however, has been light and prices have receded slightly, scales having been made at 11.50c., St. Louis, and 11.65c. to 11.75c., New York, those holding out for 12c. having been nonsellers. Many think that a reaction downward is now due and may continue, but the market is quiet and has generally come to a halt.

**Spelter.**—The market continues in its stagnant condition. Futures still command more than early deliveries but as a whole quotations are a shade lower if anything. The high ore costs continue to act as a prop to the market, imparting a resistance to decline that would otherwise be felt. Early delivery of prime Western is quoted at 9.25c., St. Louis, or 9.50c., New York, but sales have been made at ¼c. under this price. Future delivery is firmer at 9.50c., St. Louis, or 9.75c., New York, at which one or two sales of fair quantities are reported. There is a controversy on at Washington as to the prices for high-grade spelter for further purchases of the Government. No decision is reported but one is expected any day. In the meantime the market is a waiting one.

**Antimony.**—Dullness continues to prevail. The market is practically unchanged at 19c. to 19.50c., New York, duty paid, for Chinese and Japanese grades, early delivery. Futures are more active than nearby positions.

**Aluminum.**—No. 1 virgin metal, 98 to 99 per cent pure, is nominally unchanged at 59c. to 61c., New York, for prompt and early delivery, with demand slack.

**Old Metals.**—The market is quiet with the exception of lead, which is very active. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	31.00 to 31.50
Copper, heavy and wire.....	29.50 to 30.00
Copper, light and bottoms.....	27.50 to 28.00
Brass, heavy.....	20.75 to 21.25
Brass, light.....	15.75 to 16.25
Heavy machine composition.....	27.00 to 27.25
No. 1 yellow rod brass turnings.....	19.50
No. 1 red brass or composition turnings.....	21.50 to 22.50
Lead, heavy.....	11.00
Lead, tea.....	9.75
Zinc.....	7.50

#### Chicago

JUNE 25.—Though quiet, copper continues to be strongly held. In lead there has been much activity, and there is still considerable unsatisfied demand, but at the moment buyers are marking time. Consumers of tin are supplied for the present and the current demand is light. Spelter is dull and uninteresting, as it has been for months. Antimony is a trifle weaker. We quote as follows: Casting copper, 30.50c.; Lake, 31.50c. to 31.75c.; electrolytic, 32.75c. to 33c.; tin, carloads, 63.25c.; small lots, 65c. to 66c.; lead, 12c. to 12.25c.; spelter, 9.25c.; sheet zinc, 19c.; Oriental antimony, 22c. to 24c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 27c.; copper clips, 26.50c.; copper bottoms, 24.50c.; red brass, 24c.; yellow brass, 18c.; lead pipe, 9.50c.; zinc, 6.50c.; pewter, No. 1, 35c.; tin-foil, 42.50c.; block tin, 47.50c.

#### St. Louis

JUNE 25.—Non-ferrous metals have been rather quiet during the past week, but firm at the figures quoted at the close to-day: Car load lots, lead, 12c.; spelter, 9.37½c. to 9.50c.; less than car load lots, lead, 13c.; spelter, 10.50c.; tin, 68.50c.; Lake copper, 34c.; electrolytic copper, 33.50c.; Asiatic antimony, 28c. In the Joplin district, the zinc ore market was rather featureless for the greater part of the week with the range for zinc blende, basis of 60 per cent metal, at \$70 to \$80 per ton. The average for the week for the district was \$75 per ton. Lead ore was held steady at \$135 per ton, basis of 80 per cent metal, with many of the producers believing that better prices are ahead and holding the ore accordingly. The week's average for the district was at the top price. Calamine was firm at \$38 to \$45 per ton, basis of 40 per cent metal, with the week's average for the district at \$45 because of the quantity of premium grade ores sold. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 12.50c.; heavy yellow brass, 15c.; heavy red brass and light copper, 20c.; heavy copper and copper wire, 23.50c. to 24c.; pewter, 25c.; tin-foil, 40c.; lead, 6.50c.; zinc, 6c.; tea lead, 4c.

The Reading Iron Co. is installing a forge at its North Reading, Pa., plant, the cost of the building being \$8,000.

## Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 76.1c., minimum carload, 40,000 lb. Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 60,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

### Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs,  $\frac{1}{4}$  in. thick and over, and zees 3 in. and over, 4.50c.

### Wire Products

Wire nails, \$4.00 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire is \$4.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.95; galvanized wire, \$4.65; galvanized barb wire and fence staples, \$4.85; painted barb wire, \$4.15; polished fence staples, \$4.15; cement-coated nails, \$3.90 base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 43 per cent off list for carload lots, 42 per cent off for 1000-rod lots, and 41 per cent off for small lots, f.o.b. Pittsburgh.

### Nuts and Bolts

Discounts in effect are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 40 per cent, small cut thread, 35 and 2½ per cent; large, 25 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 per cent; large, 30 per cent.

Machine bolts, c. p. c. and t. nuts, small, 30 per cent; large, 20 per cent. Bolt ends, h. p. nuts, 30 per cent; with c. p. nuts, 20 per cent. Lag screws (cone or gimlet point), 45 per cent.

Nuts, h. p. sq. blank, \$2.10 off list, and tapped, \$1.90 off; hex. blank, \$1.90 off, and tapped, \$1.70 off; nuts, c. p. c. and t. sq. blank, \$1.70 off, and tapped, \$1.50 off; hex. blank, \$1.60 off, and tapped, \$1.40 off. Semi-finished hex. nuts, 50 and 10 per cent. Finished and case-hardened nuts, 50 and 10 per cent.

Rivets 7/16 in. in diameter and smaller, 40 per cent.

### Wire Rods

We quote soft Bessemer and open-hearth rods to domestic consumers at \$95 to \$100; high-carbon rods made from ordinary open-hearth steel, \$100 to \$110, and special steel rods with carbons running from 0.40 to 0.60, \$100 to \$110 at mill; above 0.60 carbon, \$115 to \$120.

### Railroad Spikes and Track Bolts

We quote railroad spikes 9/16 in. and larger at \$4.50 base;  $\frac{3}{4}$  in., 7/16 in. and  $\frac{1}{2}$  in., \$5.50 to \$6.00 base; 5/16 in., \$6.00 to \$6.50 base. Bolt spikes are about \$6.50 to \$7.50 base, all per 100 lb. f.o.b. Pittsburgh, but some makers are quoting above these prices. We quote track bolts with square nuts at 6c. to 6.50c. to railroads, and 7.50c. to 8c. in small lots, for fairly prompt shipment.

### Steel Rails

Angle bars at 3.50c. to 3.75c. at mill, when sold in connection with orders for standard section rails, and on carload and smaller lots, 4c. to 4.25c. at mill. We quote light rails as follows: 25 to 45 lb., \$60; 16 to 20 lb., \$61; 12 and 14 lb., \$62; 8 and 10 lb., \$63; in carload lots, f.o.b. mill, with usual extras for less than carloads. Standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, per gross ton, Pittsburgh.

### Tin Plate

We quote long terne plate, No. 28 gage base, at \$7.25 to \$7.50; short terne plate, \$12 to \$12.50, maker's mill, prices depending on quantity and delivery wanted. The present schedule of prices on terne plate is as follows: 8-lb., 200 sheets, \$14 per package; 8-lb., 214 sheets, \$14.30 per package; 12-lb., I. C., \$15.25 per package; 15-lb., I. C., \$15.75 per package; 20-lb., I. C., \$16.50; 25-lb., I. C., \$17.25; 30-lb., I. C., \$18; 35-lb., I. C., \$18.75; 40-lb., I. C., \$19.50.

### Iron and Steel Bars

We now quote steel bars at 4.50c. to 5c. for delivery late this year, and 5c. and higher from warehouse, in small lots for prompt shipment. We quote refined iron bars at 4.75c. and railroad test bars at 5.25c. in carloads and larger lots f.o.b. mill.

### Wrought Pipe

The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from May 1, 1917, all full weight:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1½, ¾ and ¾	42	15½	1½ and ¾	30	3
1½	46	31½	¾	31	4
¾ to 3	49	35½	¾ to 1½	35	17
				38	22
Lap Weld					
2	42	29½	1½	23	8
2½ to 6	45	32½	1½	30	16
7 to 12	42	28½	2	31	17
13 and 14	32½		2½ to 4	33	20
15	30		4½ to 6	33	20
			7 to 12	32	19

### Butt Weld, extra strong, plain ends

1½, ¾ and ¾	38	20½	1½, ¾ and ¾	29	12
1½	43	30½	¾	34	21
¾ to 1½	47	34½	¾ to 1½	38	23
2 to 3	48	35½			

### Lap Weld, extra strong, plain ends

2	40	28½	1½	24	9
2½ to 4	43	31½	1½	30	16
4 to 6	42	30½	2	32	19
7 to 8	38	24½	2½ to 4	34	22
9 to 12	33	19½	4½ to 6	33	21
			7 to 8	27	15
			5 to 12	22	10

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized, but in some sections of the country discounts on less than carloads are three (3) points less (higher price) than the carload discount on both black and galvanized steel pipe.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are four (4) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are five (5) points lower (higher price).

### Boiler Tubes

Nominal discounts on less than carloads, freight added to point of delivery, effective from Nov. 1, 1916, on standard charcoal iron tubes, and from April 2, 1917, on lap-welded steel tubes are as follows:

Lap Welded Steel	Standard Charcoal Iron
1½ and 2 in.	1½ in.
2½ in.	1½ and 2 in.
2½ and 2¾ in.	2½ in.
3 and 3½ in.	2½ and 2¾ in.
3½ to 4½ in.	3 and 3½ in.
5 and 6 in.	3½ to 4½ in.
7 to 13 in.	5 and 6 in.
	7 to 13 in.

Above discounts apply to standard gages and to even gages not more than four gages heavier than standard in standard lengths.

Locomotive and steamship special charcoal grades bring higher prices.

1½ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

### Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

[Open-hearth stock, \$5 per ton above these prices.]

Blue Annealed—Bessemer	Cents per lb.
Nos. 3 to 8	8.00 to 8.50
Nos. 9 and 10	8.25 to 8.50
Nos. 11 and 12	8.50 to 8.75
Nos. 13 and 14	8.75 to 9.00
Nos. 15 and 16	9.00 to 9.25

### Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	7.80 to 8.30
Nos. 22 and 24	7.85 to 8.35
Nos. 25 and 26	7.90 to 8.40
No. 27	7.95 to 8.45
No. 28	8.00 to 8.50
No. 29	8.05 to 8.55
No. 30	8.15 to 8.65

### Galvanized Black Sheet Gage—Bessemer

Nos. 10 and 11	8.75 to 9.25
Nos. 12 and 14	8.85 to 9.35
Nos. 15 and 16	9.00 to 9.50
Nos. 17 to 21	9.15 to 9.65
Nos. 22 and 24	9.30 to 9.80
Nos. 25 and 26	9.45 to 9.95
No. 27	9.60 to 10.10
No. 28	9.75 to 10.25
No. 29	10.00 to 10.50
No. 30	10.25 to 10.75

### Tin-Mill Black Plate—Bessemer

Nos. 15 and 15½	7.30 to 7.80
Nos. 17 to 21	7.35 to 7.85
Nos. 22 to 24	7.40 to 7.90
Nos. 25 to 27	7.45 to 7.95
No. 28	7.50 to 8.00
No. 29	7.55 to 8.05
No. 30	7.55 to 8.05
Nos. 30½ and 31	7.60 to 8.10

## IRON AND INDUSTRIAL STOCKS

### Very High Interest Rate Dominating Feature of the Market

NEW YORK, June 27.—The fact that call money commanded 6 per cent interest throughout all of last week was a dominating factor in the stock market. This high rate was perhaps a natural accompaniment of the very heavy demands for financing the Government's requirements, including payments on the Liberty loan. The co-operation of the British Government in holding down interest rates had a very helpful effect. This attitude of London brought about the releasing of \$73,000,000 in gold for shipment from Canada to this country, establishing a new high record for gold shipments, and even heavier shipments are expected at an early date. The fear in regard to the Government insisting on very low prices for some products had a depressing effect on steel stocks. United States Steel common fluctuated throughout the week, closing at its best price for the week, which was about the same as that at the close of the previous week. Bond prices were established at low record levels during the week, while money rates touched the high level of the year. The announcement that New York City would make a test of investment conditions with a \$55,000,000 issue of 4½ per cent bonds to be offered July 12 was received with much interest. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.. 27 - 31½	Int. Har. of N. J.,
Allis-Chal., pref.. 84¼ - 85¾	pref. .... 116¼
Am. Can. com.... 46¾ - 50½	Int. Har. Corp.,
Am. Can. pref.... 104 - 105½	com. .... 65 - 70
Am. Car & Fdy.,	Int. Har. Corp.,
com. .... 73 - 80½	pref. .... 102
Am. Car & Fdy.,	Lackawanna Stl., 93¾ - 98
pref. .... 116 - 116½	Lake Sup. Corp., 19½ - 20½
Am. Loco., com.. 69 - 74¾	Lima Loco. .... 55
Am. Loco., pref.. 104½ - 104¾	Midvale Steel... 61½ - 64½
Am. Ship. com... 83 - 87½	Nat.-Acme .... 34¼ - 36
Am. Ship. pref.... 94¾	Nat. En. & Stm.,
Am. Steel Fdries. 68 - 74	com. .... 38½ - 40½
Bald. Loco., com. 61½ - 74¾	Nova Scotia Steel 99 - 109
Beth. Steel, com. 141 - 146	Pitts. Steel, pref. .... 100
Beth. Steel,	Pressed Stl. com. 74¾ - 78¾
Class B ..... 135 - 144	Ry. Steel Spring,
Beth. Steel, pref.... 120	com. .... 52½ - 57
Cambria Steel ..... 160	Ry. Steel Spring,
Carbon Stl. com. 102 - 103	pref. .... 96¼ - 98
Central Fdry.,	Republic, com.... 88¾ - 92½
com. .... 33 - 36	Republic, pref.. 103½ - 103¾
Central Fdry.,	Sloss, com. .... 57¼ - 61
pref. .... 53 - 55½	Sloss, pref. .... 95
Charcoal Iron,	Superior Steel... 45¾ - 49½
com. .... 8½ - 9¼	Superior Steel,
Chic. Pneu. Tool. 73¼ - 76	1st pref. .... 100½
Colo. Fuel ..... 50 - 53½	Transue-Williams. 46 - 46½
Cruc. Steel, com.. 79½ - 88½	Un. Alloy Steel.. 44¼ - 46
Cruc. Steel, pref.. 102 - 103	U. S. Pipe, com.. 20¾ - 24½
Gen. Electric... 156½ - 162½	U. S. Pipe, pref.. 56½ - 57½
Gt. No. Ore Cert. 31¼ - 33¼	U. S. Steel, com.. 125½ - 131½
Gulf States Steel. 123 - 130	U. S. Steel, pref.. 117½ - 117¾
Int. Har. of N. J.,	Va. I. Co. & Coke 69¾ - 71½
com. .... 112 - 112½	Warwick ..... 9 - 9½
	Westing. Elec. .. 50¾ - 52¾

### Dividends

The American La France Fire Engine Co., Inc., quarterly, 1½ per cent on the preferred, payable July 2.  
 The Atlantic Steel Co., quarterly, 1½ per cent and extra 5 per cent on the common, payable July 2.  
 The Billings & Spencer Co., quarterly, 2 per cent and extra 3 per cent, payable July 2.  
 The Central Foundry Co., quarterly, 2 per cent on the first preferred, payable July 16.  
 The Cleveland Automatic Machine Co., quarterly, 1¼ per cent on the common.  
 The Crocker-Wheeler Co., quarterly, 2 per cent and extra 1 per cent on the common, and 1¼ per cent on the preferred, payable July 14.  
 The Crucible Steel Co. of America, 2 per cent on account of accumulated dividends on the preferred payable July 31. This leaves only 2 per cent due on back dividends.  
 The General Motors Corporation, quarterly, 3 per cent on the common and 1½ per cent on the preferred, payable Aug. 1.  
 Manning, Maxwell & Moore, quarterly, 1½ per cent, payable June 30.  
 The National Tool Company, quarterly, 3 per cent on the common and 1¼ per cent on the preferred, payable July 1.  
 The Nova Scotia Steel & Coal Co., Ltd., 2½ per cent on the common and 2 per cent on the preferred, payable July 14.  
 The Otis Elevator Co., quarterly, 1¼ per cent on the common and 1½ per cent on the preferred, payable July 16.  
 The Pittsburgh Steel Co., quarterly, 2 per cent on the preferred, payable July 2.  
 Standard Screw Co., 6 per cent on the common, 3 per cent on the preferred A and 3½ per cent on preferred B, all payable July 2.

The Westinghouse Electric & Mfg. Co., quarterly, 87½c. on the common, payable July 31, and 87½c. on the preferred, payable July 16.

The Wheeling Mold & Foundry Co., quarterly, 2 per cent on the preferred, payable July 2.

The Worthington Pump & Machinery Co., 1½ per cent on the preferred B, payable July 2.

## SHOW PATRIOTIC SPIRIT

### Boiler Makers Anxious to Do Their Part—Convention Meets at Pittsburgh

The second annual convention of the American Boiler Manufacturers' Association met in the William Penn Hotel, Pittsburgh, Monday and Tuesday, June 25 and 26. A resolution offering to operate the plants to the best interest of the country in its present war crisis, was adopted. Owing to the great activity in the boiler trade, and the fact that a large number of boiler manufacturers were summoned to Washington to confer with officials on war matters, the attendance was much lighter than usual. Only 40 to 45 members attended the first session Monday morning. M. H. Broderick, Broderick Mfg. Co., Muncie, Ind., was in the chair. H. N. Covell, Lidgerwood Mfg. Co., Brooklyn, N. Y., is secretary. In his opening address, President Broderick stated that the demand for marine boilers for equipment of boats to be built by the Government for war purposes, also for ocean transportation, would be so great that all makers of marine boilers would have to turn in and furnish a very large part of their output for Government use while the war lasts. The situation now is that most boiler manufacturers are making a general line of boilers, but in the very near future will have to change over and make the greater part of their output in marine boilers. Thomas E. Durban, chairman of the Uniform Boiler Law Society, stated that Government specifications for marine boilers will shortly be altered so that all tubular boiler manufacturers can meet them. He also stated that New York, Michigan, New Jersey and Minnesota had adopted the boiler code of the American Society of Mechanical Engineers, and also that specifications for a power plant of the Naval Training Station at Newport, R. I., adhered to this code. He pointed out that boiler manufacturers are suffering because of insufficient knowledge regarding the kind of material needed in their business, and emphasized the need of closer relations of boiler manufacturers and the Government.

George A. Luck, chairman of the Massachusetts Board of Boiler Rules, stated that the Massachusetts code has been changed to make the age of the boiler date from the time of its final inspection, instead of the time it was completed in the shop, and to allow the use of smaller flat seated valves than bevel seated valves. He also stated that the Massachusetts board would consider any suggestions for revising its code, but that up to the present time no recommendations or suggestions have been made to it.

Analyzing the conditions that are likely to exist after the war, C. V. Kellogg, vice-president, pointed out that the allied nations have become more efficient and self-dependent, that their financial condition is such that they will not be able to buy extensively and the probability is that after the war they will be able to do their own reconstructing, and also sell to us. This condition suggests the need of better co-operation between the manufacturers, freer distribution of cost data, and closer co-operation with the Government.

At the afternoon session, the National Tube Co. showed moving pictures describing the manufacture of Shelby Seamless steel tubing at its works at Ellwood City, Pa.

D. M. Metcalf, chief inspector, Toronto, Ontario, stated that the need for boiler plates in Canada is so great that in some cases 9/16-in. plates were substituted for ¾ in., and anything that will stand the pressure is acceptable; also that Ontario has made marine boilers for shipment to the United States.

Wednesday the manufacturers visited the plant of the National Tube Co. at McKeesport.



# Radical Change of Organization Planned

Buying Methods at Washington to Be Revised—Special Committee Will Probably Have Large Power—Copper Producers Said to Have Decided on Proposition as to Prices

WASHINGTON, June 26.—Difficulties in the way of securing legislation creating the proposed International Purchasing Commission, together with developments demonstrating that the Council of National Defense with its 150 committees is losing its efficiency through microscopic ramification, promise to result in the complete reorganization of the council and the vesting in a special committee of that body of the powers which it was intended to bestow upon the purchasing commission. The change is likely to be made at an early date, as the efficiency of the council is rapidly deteriorating through duplication of work and lack of co-ordination among the workers.

The first step in the reorganization will be a reclassification of the functions of the committees now in existence which will probably be reduced from more than 150 to 10 or 12. These committees, instead of being subordinate to the Advisory Commission, would report direct to the council and their chairmen would meet with the council at frequent intervals to keep the executive departments, the heads of which constitute the council, in close touch with all developments.

One of the most important results of the reorganization will be the designation of a special committee to act as a purchasing agency. This body will probably be divided into two parts possibly presided over by vice-chairmen, one of which will be devoted to the buying of raw materials while the other will purchase finished products. There is also under advisement the designation of a priority agent, who would be a member of the purchasing commission and whose duty it would be to study the needs of the various branches of the Government service and of the allies and assist in systematizing the work of the commission, especially with a view to bringing the actual necessities in the shape of war material to the attention of the manufacturers of the country in such a way that the most pressing requirements would receive first consideration. Owing to lack of such co-ordination in current buying, it has occasionally happened that the facilities of manufacturers in certain lines would be engaged for a long period in advance for the production of material not immediately needed, while far more pressing requirements could not be filled because of these prior engagements.

Embraced in the plans for the reorganization of the council is the appointment of a war industry board, which would probably take over many of the functions of the present general munitions board. The new board would be made up of men not associated with any particular industry and would perform much of the work now delegated to a large number of special subcommittees, each made up of men prominent in special lines of manufacture. The work of these numerous subcommittees in an advisory capacity has been of great value, but as their members are necessarily absent from Washington much of the time, the council has been obliged to decide for itself many questions which would have been referred to the proposed industrial board, had it been in existence. It goes without saying that the make-up of such a board will be of vital importance to the industries of the country and its selection is awaited with great interest.

The members of the Council of National Defense are beginning to show considerable solicitude concerning the perfectly logical results of the purchasing of staple commodities by the Government at prices far below the market. Already this buying has become an important contributing factor in raising costs to private consumers and the rather vague statement is now made by members of the council that it is hoped that some method may be found whereby the proposed purchasing commission can "protect individual buyers against ar-

bitrary price raising as the result of heavy Government demands." Just exactly what is in the minds of members of the council in this connection does not appear and developments will be awaited with the liveliest curiosity.

Representatives here of numerous important industries are expressing much dissatisfaction in regard to the policy under which the Government is proceeding in the buying of material. No one cares to be quoted, but very vigorous declarations are being privately made and will probably be publicly voiced in connection with the inquiries undertaken by the Federal Trade Commission and the Senate Committee on Interstate Commerce. Steel men declare that if the Government insist on being supplied with unlimited quantities of plates, shapes and other forms of steel at prices on a par with those agreed to by the producers for limited amounts for naval vessels, the price to private consumers and also to the Allies will have to be proportionately increased in view of the present scale of costs of production. Steel men and those representing other industries are not willing to believe that Congress will authorize the commandeering of either output or plants in this country for the benefit of the Allies as well as the United States and they point to the fact that up to the present time no Government official has definitely stated that any such idea was entertained. It should be borne in mind in this connection, however, that if the plan for an international purchasing commission is carried through, the American Government will be more or less embarrassed, should it attempt to seek preferential prices for itself while spending billions of dollars of the Allies' money.

The copper producers are said to have decided that they will charge the American Government 25 cents a pound for their product while the Allies must pay 38 cents. Several weeks ago, Bernard Baruch, chairman of the Committee on Raw Material, announced that he had secured an agreement from the copper people to supply 45,000,000 pounds at 16 2/3 cents per pound. It was then stated that this quantity would meet the needs of the Government for an indefinite period, but it is now reported that the Navy will require at least 110,000,000 pounds additional, while the War Department will need at least 125,000,000 pounds. These huge requisitions would absorb a large part of the year's output and the producers are disposed to protest vigorously against being obliged to turn over any such amounts at a price so far below the market.

The lead committee of the Advisory Commission has offered the Government July lead for immediate delivery at 8 cents a pound or about two-thirds the market price. The price of lead for future delivery, it is said, will be governed by market conditions. The position of zinc producers is similar to that of the lead men. Zinc and aluminum producers, however, have promised to furnish these products in any quantity required during the war at prices approximating two-thirds of the present market for those metals.

W. L. C.

## The Government to Make Electric Steel

The Government is expected to manufacture electric steel for both projectiles and steel castings at the earliest opportunity in various parts of the United States. Contracts will probably be signed soon for six 6-ton Heroult electric furnaces. Three of these, it is understood, will be installed at the new Government projectile plant at Charleston, W. Va., while the other three will produce steel castings, one at the Washington Navy Yard, one at Puget Sound and one in the Boston district.

## PERSONAL

H. E. Smith, engineer of tests, New York Central Railroad, is now chairman of the Wrought Iron Committee of the American Society for Testing Materials. S. V. Hunnings resigned as chairman this week, as he passed from the consumer class to the producer class by retiring from the American Locomotive Co. to join the Washington Steel & Ordnance Co.

M. M. Moore, formerly with the Machine Tool Department of Gaston, Williams & Wigmore, Inc., New York, has severed his connection with that firm, and is now associated with the sales department of John W. Thorne & Co., Inc., 165 Broadway.

George H. Court, sales manager, Topping Brothers, 122 Chambers Street, New York, in connection with the changes noted in THE IRON AGE of June 21, has been made a member of the board of directors of the company.

Henry M. Leland, president, Cadillac Motor Car Co., Detroit, and his son, Wilfred C. Leland, general manager, have resigned their positions to serve the Government in solving the aeronautical problems facing it. Henry M. Leland has studied the aeroplane problems in England, and has been called to Washington several times by the Government and the National Council of Defense. Mr. Leland founded the Cadillac Motor Car Co., and even since its absorption by the General Motor Co. has been the leading figure in its development. He is one of the best known automobile men in the country. R. H. Collins will be the new general manager of the Cadillac.

T. P. Draper, assistant superintendent of blast furnace and steel department of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has resigned, effective July 1, to become assistant general manager of operations of the Trumbull Steel Co. Mr. Draper has been with the Youngstown Sheet & Tube Co. for nine years. F. C. Farrell has been made assistant superintendent of the converting and blooming mill departments; A. R. Finch is foreman of the converting mills to take the place vacated by Mr. Farrell. A. L. Smith has been named assistant superintendent of the open-hearth departments. H. S. Braman, superintendent of blast furnace and steel department, is assisted by C. H. Elliott.

James Farrington, superintendent of the electrical department, LaBelle Iron Works, Steubenville, Ohio, talked on "By-product Coke Ovens in the Steel Industry" at the June meeting of the Association of Iron & Steel Electrical Engineers, at Pittsburgh.

Oliver O. Brace has resigned as sales manager of the Farrell-Cheek Steel Foundry Co., Sandusky, Ohio, to devote his entire attention to the Sandusky Nut Co., of which he is president.

H. G. Baldwin, Cleveland, superintendent of the order and warehouse department of the American Steel & Wire Co., has been elected a director of the company, filling the vacancy caused by the death of Charles A. Vogt.

William H. Lindsey has been appointed president, Crescent Coal Co., Nashville, Tenn., succeeding Whitford R. Cole.

J. C. McQuiston, president Pittsburgh Advertising Club and manager Westinghouse Department of Publicity, spoke at the meeting of the Pittsburgh Hardware Dealers' Association held in that city, Friday evening, June 22, on the subject, "Co-ordinating Local with National Advertising."

Albert P. Weigel has resigned as general manager of the Superior Machine Tool Co., Kokomo, Ind., and has organized the Weigel Machine Tool Co., Peru, Ind. The new company will be in operation by July 15.

O. M. Stowe, who resigned as treasurer of the D. M. Sechler Improvement & Carriage Co., Moline, Ill., on March 1, has accepted the position as manager of the 3P Auto Tractor Co., Davenport, Iowa, recently organ-

ized to manufacture a tractor attachment for Ford automobiles.

Sherley S. French, formerly general manager of the William Tod Co., Youngstown, Ohio, is now a similar position at the plant of the General Fireproofing Co., that city. Before going with the William Tod Co., Mr. French was chief clerk at the mill offices of the Brier Hill Steel Co.

J. D. Holloway, Pittsburgh district sales manager for the Wheeling Steel & Iron Co., Wheeling, W. Va., has gone to Fort Benjamin Harrison Camp at Indianapolis, as a member of the Army Officers' Reserves.

R. C. Beerbower, for some years superintendent of the Davidson, Coalbrook and Adelaide plants of the H. C. Frick Coke Co. in the Connellsville region, has resigned to become general superintendent for the Washington Coal & Coke Co. at Star Junction, Pa., effective July 1.

Waddill Catchings, president of the Sloss-Sheffield Steel & Iron Co., has been appointed assistant to the director of the Council of National Defense. Mr. Catchings is also the chairman of a new committee of the Chamber of Commerce of the United States, which will co-operate with the council. A series of war bulletins will be issued to the National Chamber for the purpose of placing before business men authoritative statements regarding Government activities in procuring materials and supplies for the war. The first of the series explains how Government specifications are being changed to meet practical war conditions, how sources of supplies are being surveyed and developed, and how conclusions are being reached as to fair and reasonable prices.

### Chattanooga Steel Co. Equipment Sold

Early in March, 1916, the Chattanooga Steel Co. was organized at Chattanooga, Tenn., for the purpose of building a plant at North Chattanooga, to contain two 75-ton open-hearth furnaces, a 34-in. blooming mill, sheet, tin plate and hoop and cotton tie mills. C. E. James, a banker, was active in the formation of the company, but for various reasons the project did not go through. The contract for the 34-in. blooming mill was placed with the National Roll & Foundry Co. at Avonmore, Pa., while the flywheel motor set was placed with the Westinghouse Electric & Mfg. Co., East Pittsburgh. Other smaller contracts for equipment were placed, and a good deal of machinery was on the ground. The National Roll & Foundry Co. never shipped the blooming mill, having stored it at its plant. The rapid rise in prices of steel and the large increase in open-hearth capacity greatly enhanced the value of this blooming mill, and while its original cost was \$225,000, one large steel company some months ago offered \$400,000 for it, but did not obtain it. More than double the price of the flywheel motor set was also offered, but was refused. Recently, however, H. E. Sheldon, president of the Allegheny Steel Co., Brackenridge, Pa., has purchased the blooming mill through C. E. James of Chattanooga, and all the other equipment on the site of the proposed plant at North Chattanooga, including material for steel mill buildings and a large amount of machinery of various kinds. Mr. Sheldon made the purchase on his personal account. The blooming mill and the flywheel motor set, together with some of the other equipment at North Chattanooga, may be shipped to the mills of the Allegheny Steel Co. at Brackenridge, and utilized there, but this has not been definitely settled.

### Acquisition of Seaman-Sleeth Co.

The New York banking house of William Morris Imbrie & Co. announces that it has bought control of the Seaman-Sleeth Co., Pittsburgh, the well-known manufacturer of rolls, of which J. S. Seaman has long been the head. It is stated that a new company will be formed to take over the business and assets and that details of the organization will be given later. The Phoenix Roll Works, as the plant at Pittsburgh was known, were established in 1870.

## RALLY TO THE RED CROSS

### Employers and Employees Subscribe Liberally— Many Dividends Declared

Quickly following the splendid record made by iron, steel and machinery companies in subscriptions to the Liberty bonds, campaigns for subscription to the American Red Cross were started throughout the country and employers and employees worked enthusiastically with highly satisfactory results. An example of the appeals made to employees is furnished by that of the Virginia Iron, Coal & Coke Co., Roanoke, Va., which was in part as follows:

"When our own sons, brothers and friends are fighting for our liberty 3000 miles from home, in a country already sorely and sadly afflicted, surely we cannot do less than prepare to take care of them in the day of suffering. The Virginia Iron, Coal & Coke Co. wants all of its employees to help this most excellent work by giving of their means as liberally as they possibly can. The men in the trenches are making many sacrifices for us; let us make a few sacrifices ourselves in order to contribute to their welfare. We need a sense of sacrifice."

The Westinghouse Electric & Mfg. Co., East Pittsburgh, declared a special Red Cross dividend of one-half of one per cent on its common and preferred stocks, amounting to \$187,000. Other dividends declared for the Red Cross were: The American Locomotive Co., 1 per cent on the common; the American Radiator Co., 1 per cent on the common; Bethlehem Steel Co., 1 per cent on Class A and Class B; the Crocker-Wheeler Co., 1/2 of 1 per cent; the General Electric Co., 1 per cent; the Standard Screw Co., 1 per cent on the common; the Terry Steam Turbine Co., 1 per cent.

Among the notable contributions to the Red Cross by Chicago firms in the past week were the following: Joseph T. Ryerson & Son, \$50,000; Pickands, Brown & Co., \$25,000; Iroquois Iron Co., \$25,000; Mark Mfg. Co., \$25,000; Central Electric Co., \$25,000; By-Products Coke Corporation, \$15,000; Standard Forging Co., \$10,000; Rich Tool Co., \$5,000; Semet-Solvay Co. (for Chicago district), \$5,000; Fairbanks, Morse & Co., \$25,000; Hibbard, Spencer, Bartlett & Co., \$10,000; Crerar-Adams Co., \$4,000.

At the noon luncheon of the Red Cross War Relief Fund Committee of Youngstown, Ohio, held Friday, June 22, J. A. Campbell, president of Youngstown Sheet & Tube Co., announced that his company as a corporation had subscribed \$100,000. Other subscriptions in the mills and offices will increase this amount to \$200,000. The Brier Hill Steel Co. announced a contribution of \$25,000, and the Republic Iron & Steel Co. the same, and there will be considerable additional subscriptions from employees of both companies. The personal subscription of J. A. Campbell was \$10,000. The subscriptions to the Red Cross War Relief Fund of Youngstown will exceed \$600,000, more than twice the amount assigned to that city.

The Inland Steel Co., Chicago, which recently subscribed for \$1,000,000 worth of Liberty loan bonds, has given \$100,000 to the American Red Cross to aid its drive this week for a \$100,000,000 war fund.

Harry L. Rownd, vice president and director of the Republic Iron & Steel Co., was commander-in-chief of the forces in Youngstown that raised \$601,699.40 for the American Red Cross last week. The employees of the Carnegie Steel Co. in Youngstown gave \$30,100 of this amount. Employees connected with other Youngstown steel companies gave in the same proportion.

Ferdinand Schlesinger, Milwaukee, head of the Northwestern Iron Co., Newport Mining Co. and numerous other industries, was the largest individual contributor to the Milwaukee fund raised for the American Red Cross during the week of June 18 to 25, with a donation of \$50,000 in cash. One of the largest gifts by a single industry was that of \$20,000 by the International Harvester Co., Milwaukee works. Other large Milwaukee donors include: The Falk Co., \$6,000;

Pressed Steel Tank Co., Kearney & Trecker Co., Kemp-smith Mfg. Co., Cutler-Hammer Mfg. Co., \$5,000 each; Thomas Furnace Co., Northwestern Malleable Iron Co., \$2,500 each; A. O. Smith Co., \$2,000; Bucyrus Co., \$1,500; Geuder, Paeschke & Frey Co., \$1,000. Frank R. Bacon, president Cutler-Hammer Mfg. Co., and Mrs. Bacon made a joint individual gift of \$10,000.

The quota of Youngstown, Ohio, for the Red Cross War Fund was \$250,000, and that city raised \$610,000. That city stood third in the country in its liberality in subscriptions to the Red Cross Fund, Cleveland being first, and New York second. The per capita gift of Youngstown to the Red Cross Fund was \$5.66.

## CONTROL OF IRON AND STEEL

### Important Amendment to Food Bill—Changes Being Made in Tax Measure

WASHINGTON, June 26.—The extension of the principle of Federal control underlying the Administration's food regulation bill to iron and steel and their products, farm implements, petroleum and its products, and sisal, jute and hemp products, including binding twine, is provided for in an amendment agreed upon to-day by a sub-committee of the Senate Committee on Agriculture. The addition of other articles is in contemplation and it is proposed to report the amendment immediately in order that it may be added to the food regulation bill before that measure is passed by the Senate.

The proposed amendment to the food bill would include the articles mentioned in the category denominated "necessaries" in section 1 of the pending measure. Another section of the bill establishes "a governmental control of necessities which shall extend to and include all the processes, methods, activities of, and for the production, manufacture, procurement, storage, distribution, sale marketing, pledging, financing and consumption of necessities, which shall be exercised and administered by the President for the purposes of this Act." This provision, it will be noted, is very comprehensive, and should the amendment framed by the Senate Committee to-day be finally adopted in the bill as it becomes a law, the iron and steel industry would be as completely turned over to the President for administration and regulation as the food supply.

### New Blast Furnace and Open Hearth Plant for Mark Mfg. Co.

The Mark Mfg. Co., Chicago, manufacturer of wrought pipe and oil well casing, has announced in the past week plans for additional iron and steel works construction. Since the summer of 1916 the company has been building a Bessemer steel plant at Indiana Harbor, Ind., together with blooming mill, billet mill to roll skelp from slabs, a 10-in. skelp mill and one butt and one lap weld pipe mill. The capital of the company was recently increased from \$10,000,000 to \$25,000,000. The new plans include a 600-ton blast furnace with docks and ore and coke handling equipment, also an open-hearth steel plant with a capacity of 250,000 tons of ingots per year. There is included, in addition, a universal plate mill with a capacity of 180,000 tons per year.

### Asks for \$9,500,000 for Rifle Machinery

Secretary of War Baker has asked Congress to appropriate \$9,500,000 for the purchase of machinery to make rifles for the army, a deficiency estimate having been sent to the House of Representatives. Secretary Baker said it was important that this special appropriation shall be supplied at once.



## Pittsburgh and Nearby Districts

A contract has just been awarded by the Carnegie Steel Co. to Stone & Webster for the erection of 200 houses on the site of the proposed model town of McDonald, near Youngstown. The contract will involve the expenditure of over \$500,000. Some of the new McDonald bar mill units will be operating within a few months. Stone & Webster also have the contract for grading the more than 600-acre town site on which the houses are to be erected. A force of nearly 500 men has been working there for some time.

At the organization meeting of directors of the Westinghouse Electric & Mfg. Co., held in New York City last week, all former officials were re-elected, and also three new vice-presidents as follows: H. D. Shute, who has been treasurer of the company; H. T. Herr, who has been vice-president of the Westinghouse Machine Co., now merged with the electric company, and Walter Carey, who has been vice-president of the Westinghouse Lamp Co. H. F. Baetz, who has been connected with the company for 30 years, and who worked his way up from office boy to assistant treasurer, succeeds Mr. Shute as treasurer and assistant secretary.

The Sanitary Products Corporation, Meadville, Pa., has been incorporated in Delaware with a capital of \$150,000, to manufacture surgical instruments, etc. James C. Shults, Meadville; Louis Raphael and D. L. Aber, Pittsburgh, are the incorporators.

## Bon Air Coal & Iron Corporation

The Bon Air Coal & Iron Corporation, recently organized with a capital of \$10,000,000, has acquired the Bon Air Coal & Iron Co. properties in Tennessee. Alexander R. Peacock, New York, is president; John McE. Bowman, New York, treasurer and chairman of the board of directors; A. M. Moreland, Pittsburgh, secretary and general manager, and W. J. Cummins, Nashville, Tenn., vice-president and general sales manager. The properties consist of two blast furnaces at Allen's Creek, Tenn., an iron mine producing brown hematite ore at Allen's Creek, 200 beehive coke ovens at Eastland, Tenn., and extensive coal and timber lands on the Cumberland plateau in Caney River Fork section and in Wayne County, Tenn. The blast furnaces will be improved and two stoves added. The output of the Allen's Creek mine will be increased and additional equipment will be installed in the coal mines at Bon Air, Ravenscroft and Eastland with a view to increasing coal production to 10,000 tons a day. Since 1910 the properties have been in the hands of Robert Vaughn and E. C. Lewis, receivers. They were bought in for the new company at receiver's sale at Nashville, June 15, by William J. Cummins. The new construction work is expected to involve an outlay of \$1,000,000. A. R. Peacock and A. M. Moreland of the new organization were formerly officers of the Carnegie Steel Co.

## Two More Open Hearths

YOUNGSTOWN, June 26.—Announcement is made by J. W. Deetrick, vice-president and general manager of the Republic Iron & Steel Co., that it will commence at once to construct two additional open hearth furnaces and two soaking pits, increasing the ingot capacity of the open hearth department to 60,000 tons a month. With the completion of the furnaces the company will have 14 open hearths. A blast furnace of 550 capacity will be started on making basic iron shortly to help out the supply required to keep the plant going to capacity.

The Low Moor Iron Co. has operated its A and B furnaces at Low Moor, Va., as alternate stacks. Some years ago the company provided for additional equipment in order to operate them as separate units, but the work was not completed. One additional stove is in and the company is erecting the additional boiler unit. It is now proposed to provide two more stoves and establish the necessary connections. When the work is finished both stacks will be operated at one time.

## Many More Subscribe for Liberty Bonds

In the last days of the campaign for subscriptions to Liberty bonds, many manufacturing companies reported large amounts spoken for by employees. S. B. Bowser & Co., Fort Wayne, Ind., were among the firms which conducted an active campaign. In this case the campaign was on for two days, June 12 and 13, and 91 per cent of the 1566 factory and office employees bought one or more Liberty bonds, the total being \$130,950.

The Central Iron & Steel Co., Harrisburg, Pa., was highly gratified by the record of its employees, as out of 1500 men, 1075 subscribed for a total of \$112,800.

The Red Jacket Mfg. Co., Davenport, Iowa, issued a very vigorous appeal to its employees and made it easy for them to subscribe. The form of contract provided that each employee should pay to the company only \$1 a week on the \$50 bond, which would be delivered to the purchaser December 22.

In the town of Monessen, Pa., where are located plants of the Pittsburgh Steel Co., American Sheet & Tin Plate Co., Page Woven Wire Fence Co., Carnegie Steel Co. and the Monessen Foundry & Machine Co., the total subscriptions to Liberty bonds, aside from the subscriptions made by these companies themselves, amounted to \$420,000. The town of Monessen has a population of 20,000 people, hence the subscription of \$420,000 meant \$21 for each man, woman and child in that town. The employees of the Monessen plant of the Page Woven Wire Fence Co. subscribed \$54,850, which is over \$50 for each employee. This plant has about 1050 employees, and 750 subscribed, or about three-fourths of the total number of employees.

## W. E. Corey Favors Wooden Ships

William E. Corey, president Midvale Steel & Ordnance Company, is quoted in favor of the construction of wooden ships by the *Manufacturers' Record*, Baltimore, which publishes a number of letters on the subject. Mr. Corey says:

"I am in entire accord with your recommendation to build wooden ships, for ocean transportation is the all-important matter. Every ship that can be built of wood should be in the water at the earliest possible moment. Build ships of steel as well, but give preference to wooden vessels, as all the steel the world can produce is urgently required for purposes that will allow no substitution. There is an actual scarcity of steel-making materials and equipment, whereas there is an unlimited supply of wood."

## Plant Destroyed

The plant and office building of the General Foundry & Machine Co., Youngstown, Ohio, was destroyed by fire June 21. The loss was about \$60,000. The company was engaged in the manufacture of small castings and tools for the Driggs-Seabury Ordnance Co., Sharon, manufacturer of Lewis machine guns for the United States Government.

The Advisory Committee of the Rice Leaders of the World Association will give a dinner to officials of its member companies and their friends at the Hotel Astor, New York, Thursday, June 28. The banquet marks the opening of the electric display recently constructed at Times Square by the association. Following the formal illumination the guests will go to a nearby roof on which is a building 50 ft. in length housing the intricate machinery and flashing devices which operate the electrical effects. Over 500,000 ft. of wire was used and the display required six months for its construction.

The Donner Steel Co., Buffalo, has blown in its furnace B at North Tonawanda, N. Y., after relining, and it is now operating on foundry iron. The new furnace at the company's Buffalo plant, to be known as furnace No. 2, is nearly completed, and will be in operation about July 10. The company also expects to have its plate mill in operation in another week, and the bar mill probably by the latter part of July.

# Machinery Markets and News of the Works

## MORE MACHINERY SALES

### New Projects and Expanding Plants Buyers

#### Shipyard Demand Grows—Munitions Factories Again in Market—Aeroplane and Truck Industries Heavy Purchasers—Many New Corporations Formed

From nearly every machine tool center come reports that orders are becoming more plentiful, but that large lists are scarce. The demand is heaviest for fabricating shop and heavy forging machinery and in machine tools for boring mills, radial drills, planers and large lathes. Prices on many lines have been advanced from 5 to 15 per cent. Some makes of boring mills have been advanced 20 per cent and deliveries are a year or more behind. The withdrawal of price lists is increasing, but has little effect on orders.

Shipbuilding projects continue to grow apace. On the Atlantic coast the Merrill-Stevens Co., Jacksonville, Fla., and the Terry Shipbuilding Corporation, Savannah, Ga., are in the market for machinery. Contracts have been awarded for the \$1,000,000 plant of the New Jersey Shipbuilding Co., Gloucester City, N. J. The International Navigation Corporation, New York, is reported to have plans for a \$5,000,000 shipyard at Wilmington, Del. The Provincial Shipbuilding Commission is considering plans for a yard to be built in Nova Scotia by the Dominion Bridge Co. The Liberty Shipbuilding Co., Chicago, will build a yard at Montague, Mich. Puget Sound shipbuilders have contracts for 115 steel and wooden vessels of a value of \$120,000,000, of which \$80,000,000 is held by Seattle yards. The Moore Shipbuilding Co., Oakland, Cal., successors of the Moore & Scott Co., have received an order from Gen. Goethals for ten steel vessels. Several new shipbuilding companies have been organized on the Pacific coast. The Scandia-Pacific Oil Engine Co., San Francisco, has concluded arrangements to build large Diesel engines.

The Willys-Overland plant at Elmira, N. Y., has purchased tools to be used in making parts for engines for the Willys-Curtiss combination. New aircraft companies are being formed each week. Considerable business is expected to follow the passing of a Government appropriation for aircraft.

Railroad shop purchases are again becoming a market feature and the truck and tractor plants continue to be steady purchasers. Export business is expected to be hampered by Government restrictions.

## New York

NEW YORK, June 27.

Builders of airplane motors, makers of shells and the shipyards are the most active buyers of machine tools and allied equipment. The Government's proposed airplane program, contemplating a \$600,000,000 appropriation, if carried out, will undoubtedly add greatly to the present large demand for machine tools.

The combination of Curtiss airplane and Willys-Overland automobile interests has already brought out a demand for machine tools for the Willys-Overland plant at Elmira, N. Y., and the construction of an airplane-motor factory adjoining the Willys-Overland factory in Toledo, Ohio, will bring out a large inquiry. The Duesendorf Motors Corporation, Edgewater, N. J., which is building airplane engines, is inquiring for a number of machine tools for a new plant at Elizabeth, N. J., which will be occupied about Sept. 1. The inquiry includes automatic screw machines, drills, gear machines, vertical milling machines, turret lathes, crank shaft lathes and a horizontal boring mill. Considerable equipment has already been purchased. The automobile factories which will make airplane motors are expected to be in the market for precision instruments.

Greater progress is apparently being made in the shipbuilding program, although the requirements of some plants are not being filled, pending receipt of contracts from the Government, or, in some cases where the actual contracts have been placed, specifications for the ships have not been received. The Merrill-Stevens Co., Jacksonville, Fla., which has a contract to build 12 composite steamers complete and four all-steel ships complete, has purchased part of its equipment and is in the market for additional machinery, particularly for punching and shearing. The Terry Shipbuilding Corporation is making purchases for its shipyard at Savannah, Ga. The Baltimore Drydock & Shipbuilding Co. has purchased equipment aggregating about \$1,000,000 since June 1. The Babcock & Wilcox Co., Bayonne, N. J., has purchased equipment for its marine boiler works which is building engines for merchant ships. The United States navy yards are also very active buyers.

The General Electric Co. closed last week for several hundred thousand dollars' worth of machine tools for the Schenectady works. Purchases aggregating about \$3,000,000 have been made by this company the past few months. The Worthington Pump & Machinery Corporation is in the market for a complete equipment for its plant at Hazleton, Pa., to manufacture 6000 3-in. shells per day. The New York Air Brake Co. has purchased tools for the manufacture of gun carriages at its Watertown, N. Y., plant. The Marconi Wireless Telegraph Co. and the Interborough Rapid Transit Co. are also making purchases of machine tools. The New York, Ontario & Western Railway has bought tools for its Middletown, N. Y., shops.

Crane business is especially active. The Government has awarded a contract for several 330-ton electric cranes to the Alliance Machine Co., Alliance, Ohio. These will be the largest cranes ever built, and are to be used in navy shipyards. The Baltimore Drydock & Shipbuilding Co., Baltimore, Md., placed an order for seven electric overhead traveling cranes with the Shaw Electric Crane Co., and contracts for seven 12½-ton and one 75-ton cranes were awarded to the Edward S. Terry Mfg. Co., which is also building cranes for the shipyard of the Terry Shipbuilding Corporation. The Midvale Steel Co. has closed for three 20-ton cranes for its plant at Nicetown, Pa., and for one 125-ton ladle for its plant at Coatesville, Pa. The Wateree Power Co., Charlottesville, N. C., has bought one 100-ton crane and the Carpenter Steel Co. has bought a 5-ton crane for its Reading, Pa., plant. The Bullard Machine Tool Co., Bridgeport, Conn., bought two 10-ton cranes. The Foundation Co., Woolworth building, New York, which is building wooden hulls for the Emergency Fleet Corporation, will soon be in the market for a few cranes. Deliveries of cranes are lengthening in many cases to seven or eight months, but for urgent Government work quicker deliveries are being arranged.

Prices have taken another jump. Manufacturers of radial drills announced an advance of 15 per cent; large lathes have been advanced 12½ to 15 per cent and planers 10 per cent. Advances are general all along the line, ranging from 5 to 15 per cent. The General Electric Co. has announced a 10 per cent increase on all of its products.

Boring mills are in great demand and often not to be had at any price. Planers are also badly wanted, with radial drills and large lathes coming next. The inability of builders of these tools to make nearby deliveries has forced many buyers to look for second-hand tools. Second-hand dealers are having difficulty in obtaining a sufficient stock to meet the demand, because manufacturers are not, under present

conditions, willing to part with used tools when it is so difficult to get new tools with which to replace them. One builder of boring mills accepted a contract last week for delivery late in 1917, the last that can be accepted for this year. Some builders will not promise delivery of boring mills until well along in 1918. Planers are in the same class, but on some other machine tools delivery in November and December can be had. There is a good demand for small screw machines and one large order was placed last week.

Export trade is now running into difficulties. The Government has its system of export permits in good working order and shipments to neutral countries will probably not be permitted in cases where the tools are urgently needed by the Allies or the United States Government. Orders for the Allied countries have the right of way, and these will not be interfered with by the United States Government except in case of the most urgent necessity. It is known that the Government has refused permits to ship machinery to Sweden. In order to facilitate the handling of purchases for the Allied governments, including the United States, a central purchasing commission plan is being formulated by officials of the Treasury Department, and pending the organization of that body independent foreign contracts of all kinds are practically at an end.

The board of education, City Hall, Newark, N. J., has approved an appropriation of \$206,700 for the construction of a new vocational school for boys on Sussex Avenue, near First Street. The building will be of factory type, three-stories, concrete, about 170 x 225 ft., and will be equipped for instruction in toolmaking, foundry work, machine shop operations, pattern-making, woodworking, cabinet-making, machine construction, heat treatment of metals, gas and electric welding. There will also be departments for work in power plant operation, automobile construction and repair, gas and gasoline engine work. A drafting-room will be established on the third floor. Louis Sonntag, acting supervisory architect of the board, has prepared plans. Wesley A. O'Leary, 31 Clinton Street, is a director.

The Arlington Brush Co., 250 Market Street, Newark, N. J., manufacturer of brushes for jewelry work, etc., has leased property at 83 Lafayette Street for a new factory.

The Factory Supplies Corporation, Newark, N. J., has been incorporated with a capital of \$50,000 to operate a local plant for the manufacture of celluloid products. John C. Wasserbach, 76 Frankfort Street; George R. Christian and Joseph Fisher, Newark, are the incorporators.

The Eastern Cutter Salvage Co., Newark, N. J., has been organized to operate a plant at 13 Kirk Street for recutting high-speed milling cutters. Floyd J. Aker is head of the company.

The W. J. B. Motor Truck Co., Newark, N. J., has been incorporated with a capital of \$100,000. W. J. Baxter, H. F. Gleason and J. J. Bergen are the incorporators.

The Terminal Pattern & Model Works, Newark, N. J., has been organized to operate a pattern plant at 55-57 Park Street. Eugene F. Krautter, 505 South Sandford Avenue, and John C. Solmer, 70 Richelieu Terrace, head the company.

The General Electric Co., Harrison, N. J., has had plans prepared for the erection of two additions, one, two stories, of reinforced-concrete, 130 x 255 ft., and the other one-story, about 46 x 95 ft. R. H. Canfield, 22 West Fourth Street, Corning, N. Y., is engineer.

Abraham Smith, 51 Fair Street, Paterson, N. J., manufacturer of plumbers' supplies, will build a new three-story factory at 55 Hamilton Avenue to cost about \$11,000.

Jacob Walder, 188 River Street, Paterson, N. J., manufacturer of harness, mill supplies, etc., has awarded a contract for the erection of two additions to his plant.

The M. W. Kellogg Co., 117 West Side Avenue, Jersey City, N. J., manufacturer of pipe, piping materials and power plant specialties, will build a one-story brick and steel pipe shop to cost about \$44,650.

The Goldschmidt Thermit Co., Jersey City, N. J., manufacturer of welding materials, will build a new one-story plant at 539-541 Johnston Avenue, to cost about \$17,000.

The Babcock & Wilcox Co., East Third Street, Bayonne, N. J., manufacturer of water-tube steam boilers, will erect a new machine shop at First Street and Hobart Avenue to cost \$150,000.

The Electric Dynamic Co., Avenue A, Bayonne, N. J., manufacturer of dynamos and motors, has awarded contracts for the construction of two extensions to its plant.

The American Foundry Co., Elizabeth, N. J., has been incorporated with a capital of \$125,000 to operate a local foundry. Morris Jagger and Otto Froebel, Elizabeth, and M. T. McCarthy, Rahway, are the incorporators.

The proposed shipbuilding plant of the New Jersey Shipbuilding Co., Gloucester City, N. J., contract for the con-

struction of which has been awarded, will consist of a one and two-story machine shop, machine and boiler works, plate and angle shop, joiner shop and forge plant. Gantry cranes and other handling equipment will be installed. The plant is estimated to cost \$1,000,000. George F. Pawling & Co., Camden, and 1432 South Penn Square, Philadelphia, are the contractors.

The Dalton Mfg. Corporation, New York, has been incorporated with a capital of \$750,000 to manufacture machinery, engines, etc. H. A. Mossler, C. H. Purdy, and A. Krenkel, 102 Convent Avenue, are the incorporators.

The Interborough Rapid Transit Co., 165 Broadway, New York, will build a one-story power house, 30 x 60 ft., at 600 West Fifty-ninth Street, to cost about \$15,000.

The International Navigation Corporation, 204 Franklin Street, New York, is said to be planning for the construction of new shipbuilding works at Wilmington, Del., to cost about \$5,000,000. The proposed plant will include steel rolling mills, machine and forge shops and will be equipped to build steel and wooden vessels of 3000 to 10,000 tons capacity. W. H. Garland is president.

The Howden Co., New York, has been incorporated with a capital of \$500,000 to manufacture marine boilers and engines. W. P. Parker, V. Reimann and I. L. Anderson, 27 William Street, are the incorporators.

The Eagle Wrought Iron Works, 580 Jackson Avenue, New York, has filed plans for the erection of a new one-story brick shop, about 40 x 75 ft., on Jackson Avenue, near 149th Street. Gus Schlair, president.

Samuel Weisglass, 119 West Street, Brooklyn, N. Y., manufacturer of brass beds, will build a new three-story brick plant, about 100 x 160 ft., at Atlantic Avenue and Milford Street, to cost about \$75,000.

E. D. Anderson, 101 Park Avenue, New York, manufacturer of automatic machinery, has been incorporated in Delaware under the name of E. D. Anderson, Inc., with capital of \$1,000,000, to manufacture machinery.

The Nason Mfg. Co., 71 Fulton Street, New York, manufacturer of steam traps and power plant specialties has increased its capital from \$25,000 to \$250,000.

The Bethlehem Truck Co., New York, has been incorporated with a capital of \$50,000 to manufacture motor trucks. J. T. Abeles, S. M. Lazarus and W. P. Riley, 2 Rector Street, are the incorporators.

The Columbian Brass Foundry, 30 Church Street, New York, and the Columbian Bronze Corporation, Freeport, L. I., have been consolidated under the name of the latter company, with capital of \$450,000. The Columbian Brass Foundry operates a plant on North Main Street, Freeport, for the manufacture of brass fittings for motor boats and similar specialties.

The L. A. Dreyfus Co., Maple Avenue, Rosebank, Staten Island, N. Y., manufacturer of rubber specialties has increased its capital from \$100,000 to \$1,000,000.

A one-story power plant, 36 x 50 ft., will be erected by the Patterson-Sargent Co., 8 Jay Street, New York, at its new paint and varnish works at Long Island City. The entire plant will include five brick and concrete buildings, with main structure four stories, 40 x 216 ft.

The Allied Aircraft Corporation, New York, has recently been incorporated with a capital of \$250,000 to manufacture aeroplanes and other aircraft. E. W. Hubbard, N. Floyd and H. P. Green, 90 West Street, are the incorporators.

The Jones Speedometer Co., Cedar and Orchard Streets, New Rochelle, N. Y., manufacturer of speedometers and recorders, is building a reinforced-concrete addition to its plant.

The Nyack Shipbuilding Corporation, Nyack, N. Y., has been incorporated with a capital of \$100,000 to operate a local plant for the manufacture of boats and yachts. A. M. Gage, I. Hopper and A. A. G. Luders, Nyack, are the incorporators.

The Brockway Motor Truck Co., Cortland, N. Y., manufacturer of motor trucks has increased its capital from \$100,000 to \$500,000.

The Simonds Mfg. Co., Ohio Street, Lockport, N. J., manufacturer of saw steel will build a one-story addition to its plant about 50 x 165 ft.

The LeRoy Electric Porcelain Co., LeRoy, N. Y., has commenced the erection of extensions to its plant to increase the capacity. The addition will be devoted exclusively to the manufacture of electrical porcelain specialties.

The I. G. Jones Co., Syracuse, N. Y., has been incorporated with a capital of \$50,000 to manufacture boilers, engines and electrical machinery. Ira G. Jones, Frederick C. Faulkner and Hunter L. Betts are the incorporators.

The Savage Arms Corporation, Savage Avenue, Frankfort, N. Y., is reported to be planning the erection of additions to its plant to handle an order from the Government.



The Rochester Boat Works, Rochester, N. Y., has been incorporated with a capital of \$30,000 to operate a local boat and yacht building plant. B. C. Meier, V. E. and F. H. Lacy, Rochester, are the incorporators.

The Standard Pasteurizing Machine Co., Rochester, N. Y., has increased its capital from \$20,000 to \$75,000.

The Shepard Crane & Hoist Co., Montour Falls, N. Y., Joseph Shepard, president, has let contract for a machine shop addition, 45 x 90 ft.

The Rudolph Wurlitzer Mfg. Co., manufacturer of musical instruments, North Tonawanda, N. Y., has awarded contract for erection of a one-story addition, 50 x 150 ft., to its plant.

H. S. Kerbaugh, Inc., Buffalo, has commenced construction of a shipyard on Buffalo Harbor, opposite the foot of Main Street, in which will be located dry-docks, machine and repair shops, etc., for the construction of wooden ships for the Government. Work on the yards will be completed as rapidly as possible.

I. J. Lande, 507 Washington Street, Buffalo, manufacturer of optical goods, is building an addition to his factory on Washington and Ellicott streets.

The Hannawa Falls Light & Power Co., Colton, N. Y., F. A. Stoughton, general manager, Potsdam, N. Y., has completed plans for construction of a hydroelectric plant, to develop a minimum of 10,000 hp.

The Utica Gas & Electric Co., Utica, N. Y., Augustus T. Throop, manager, has let contract for a boiler house on Washington Street.

The United Paper Board Co., Lockport, N. Y., will build a power house, 100 x 100 ft., one story. Sidney Mitchell, 171 Madison Avenue, New York, is president.

## New England

BOSTON, June 23.

Business continues good in the machine-tool field, with no lessening in the demand for large-size tools. Big lists are noticeably absent, but the demand for one or two machines of a kind promises to keep the factories at maximum production for months to come. The price of radial drilling machines has been advanced 15 per cent, and the same advance has been made in lathes 24 in. and larger, and in shapers. One large builder of planers has withdrawn all prices.

A large number of New England machine tool plants and foundries are expanding to gain greater production, and the manufacturers of all kinds of metal-working machinery are showing their interest in maintaining the present output by their attendance and exhibits at the Export Conference and Exposition now being held in Springfield, Mass.

The capacity of the Connecticut brass plants is constantly being extended, and the unprecedented pace of the past two years is being accelerated. The announcement of the purchase of the Buffalo Copper & Brass Rolling Mill Co. by the American Brass Co. has created widespread interest.

The labor situation has again become acute, and the competition of the shipyards and the munitions plants will once more harass machine-tool builders. About 20,000 men are immediately needed to push the Government work, and concerted efforts are being made to utilize technical school plants to give partial training to inexperienced hands.

The Lake Torpedo Boat Co., Bridgeport, Conn., is to build a forge shop, 80 x 100 ft., one story.

The Rhode Island Foundry & Machine Co., Providence, R. I., has been incorporated with authorized capital stock of \$100,000. The incorporators are Henry S. Chaffee, 15 Elton Street; Dwight R. Bartlett and Samuel Raynor.

The R. B. Phillips Mfg. Co., Worcester, Mass., has awarded a contract for an addition, consisting of a second and third story to a one-story factory.

The Spring Perch Co., Bridgeport, has increased its capital from \$50,000 to \$100,000.

The American Brass Co., Waterbury, Conn., has awarded a contract for an addition, 51 x 68 ft., one story, to its Washington Avenue plant. The Chase Metal Works, Waterbury, Conn., has secured a permit to build a three-story addition, 32 x 160 ft.

The American Tube & Stamping Co., Bridgeport, has awarded a contract for a one-story addition, 110 x 110 ft., with wing 20 x 66 ft.

The Bridgeport Brass Co., Bridgeport, has begun the erection of a casting shop addition, 18 x 30 ft.

The Goodell-Pratt Co., Greenfield, Mass., has begun the erection of a boiler house, 30 x 70 ft., and a coal pocket.

The New Haven Machine Screw Co., New Haven, Conn., has begun work on a two-story addition, 50 x 146 ft.

The Forbes Mfg. Co., Greenwich, Conn., has been incorporated with authorized capital stock of \$50,000 to manufacture tools. The incorporators are Ewing M. Forbes, New York; Raymond E. Pearsall, Newark, N. J.; and A. W. Walton Marshall, Greenwich.

The Hartford Falcence Co., Hartford, Conn., has had plans drawn for an addition, 40 x 80 ft., one story.

The American Steel & Wire Co., Worcester, has secured permits for the erection of a four-story addition, 55 x 160 ft., and a one-story annealing building, 50 x 105 ft.

The Hanlon Locomotive Sander Co., Winchester, Mass., has been incorporated, with authorized capital stock of \$10,000, by James W. Russell, Jr., president and treasurer; J. H. Hanlon and William J. Hanlon.

The American Brass Co., Waterbury, Conn., has bought the Buffalo Copper & Brass Rolling Mill Co., Buffalo, N. Y., which operates a plant employing about 5000 men. This purchase will enable the American Brass Co. to take better care of its private business while filling the large requirements of the Government.

The Jones & Lamson Machine Co., Springfield, Vt., has commenced the erection of a one-story addition to its machine shop, about 120 x 100 ft.

## Philadelphia

PHILADELPHIA, June 25.

The foundry to be erected by the Bureau of Yards and Docks at the League Island Navy Yard, Philadelphia, will be 180 ft. instead of 80 ft. wide, as previously stated, and 648 ft. long. It will cost \$532,968.

F. R. Hansell, Philadelphia, has incorporated in Delaware the International Resilient Tire Co., with capital of \$500,000, to manufacture pneumatic and special automobile tires. S. C. Seymour, Camden, N. J., is also an incorporator.

Henry Potts & Co., Real Estate Trust Building, Philadelphia, are in the market for locomotive cranes, 15-ton capacity, and about 50-ft boom.

The Vixen Tool Co., 5001 Lancaster Avenue, Philadelphia, manufacturer of tools and files, a New Jersey incorporation, has increased its capital stock to \$300,000.

J. F. Johnson & Co., 2317 North Sixteenth Street, Philadelphia, operating machine repair shops, will erect a new two-story machine shop, about 30 x 100 ft., at 3537-39 North Ninth Street.

The G. & H. Barnett Co., 1078 Frankford Avenue, Philadelphia, manufacturer of files, has acquired property adjoining its plant on Frankford Avenue for about \$14,000, and is said to be planning to use the site for extensions.

The Robert A. Bucher Co., Philadelphia, has been incorporated in Delaware with a capital of \$10,000 to manufacture vacuum cleaners, etc. John G. Bucher, Walter F. Eyrich and Frank A. Fisher are the incorporators.

A one-story reinforced-concrete power plant for works operation will be erected by the Crew-Levick Co., Land Title Building, Philadelphia, at its proposed new oil plant on Petty's Island, Philadelphia. Other structures will include a cooper shop and barrel plant.

The Eagle Wagon Works, 4468 Richmond Street, Philadelphia, manufacturer of wagons and wagon parts, will erect a one-story shop addition, about 20 x 26 ft., at Salmon and Lefevre streets.

The Camden Motors Corporation, Camden, N. J., has been incorporated with a capital of \$1,000,000 to manufacture motors. John A. MacPeak, George H. B. Martin and I. C. Clow are the incorporators.

The Dural Rubber Corporation, room 711 Broad Street Bank Building, Trenton, N. J., recently incorporated with a capital of \$200,000, has acquired property at Flemington, consisting of five acres of land and buildings for its proposed new plant. The main structure is 40 x 200 ft., with smaller buildings to provide for electric plant, boiler room and offices. The new works will be devoted to the manufacture of automobile tires, rubber goods for aeroplanes, and aeroplane parts and specialties. Edgar H. Wilson is president.

The Berko Brothers Co., Randolph and Wood streets, Philadelphia, fabricator of structural steel shapes, has acquired property on York Road, about 140 x 210 ft., as a site for a concrete extension.

The De Laval Steam Turbine Co., East Clinton Avenue, Trenton, N. J., manufacturer of steam turbine engines, etc., will build six new buildings. The John W. Ferguson Co., Paterson, N. J., has the contract.

The Utah Potash Co., Trenton, N. J., organized with a capital of \$1,500,000 is planning for the early operation of its new plant on the 8-acre tract recently acquired near the city limits, Ewing Township. The building, now nearing completion, is 40 x 210 ft., and will be equipped with

grinding and other machinery for the production of potassium nitrate, sulphate, etc. The plant with equipment is estimated to cost \$100,000. The company is also planning for the erection of a building for the manufacture of nitrate products. Frank Harris and J. L. Le Compte, 39 West State Street, head the company.

The Parker Co-operative Co., Norwood, Pa., has been incorporated in Delaware with capital of \$100,000, to manufacture electric and gas fixtures. Joseph E. and Ralph B. Parker, Everett P. and Harold F. Collins, and Edward J. M. Smullen are the incorporators.

The Pennsylvania Stripping, Quarry & Construction Co., Hazleton, Pa., has commenced the erection of a new steel working plant and foundry for the manufacture of mine cars, steam shovels etc., for company service.

The Standard Process Steel Corporation, Easton, Pa., a New Jersey incorporation with office at Phillipsburg has increased its capital from \$300,000 to \$500,000 for extensions. The company operates a plant in the Rowland Firth section, Easton, recently established at a cost of \$100,000, for the production of hardened steel by special process. It is proposed to double the capacities of the steel and iron foundries with the installation of new equipment. O. L. Mills is president; W. B. MacFarland is assistant treasurer.

The North American Motors Co., Pottstown, Pa., is making rapid progress in the erection of its new two-story plant on Queen Street. It is expected to place the works in operation early in September.

The Sun Shipbuilding Co., Chester, Pa., is said to have awarded a contract for the construction of new shipbuilding works at Bristol, to cost about \$2,000,000. The company's property extends from Otter Creek to Edgley Avenue, including an area of about two square miles, fronting on the Delaware River. The new works will be operated in connection with the Chester plant.

The Inter-State Feed Machine & Products Co., 647 East Mason Street, York, Pa., is said to be in the market for foundry and machine shop equipment for installation at its new plant near Lincoln, to be used for the manufacture of feed machines and kindred specialties.

The new plant of the Fleetwood Metal Body Co., manufacturer of automobile bodies and other specialties, Fleetwood, near Reading, Pa., to replace the one recently destroyed by fire, will be of brick, three stories, about 104 x 290 ft. Wayne M. High, architect, Reading, is preparing plans.

The American Car & Foundry Co., Berwick, Pa., is planning for the immediate rebuilding of its machine and blacksmith shops at Huntington, W. Va., recently destroyed by fire with loss of about \$25,000.

The E. T. Fraim Lock Co., Lancaster, Pa., manufacturer of locks, vaults, etc., is having plans prepared for the erection of an addition at Hamilton Street and Park Avenue.

The Auto Signal Co., Philadelphia, has been incorporated with a capital stock of \$10,000 to manufacture auto signals and accessories. The incorporators are Louis Cherry, 502 South Sixtieth Street, and others.

The Traylor Shipbuilding Corporation, Allentown, has been incorporated with a capital stock of \$5,000 to build ships and manufacture marine and other machinery. The incorporators are William J. Roberts, Harry Battersby and Francis R. Crispen.

The Shepherd-Rust Co., Wilkes-Barre, Pa., whose incorporation was noted in THE IRON AGE of June 14, takes over the business of Shepherd & Rust, which was founded 21 years ago. George E. Shepherd and Harold N. Rust will continue to direct the policy of the new company.

## Baltimore

BALTIMORE, June 25.

Black & Decker, 115 South Calvert Street, Baltimore, Md., manufacturers of special machinery, will build a one-story factory building and boiler-house, 60 x 200 ft., at Towson, Md. It also has taken over 26 acres of land and, although no announcement has been made, it is understood the property will be developed to provide homes for employees.

The Baltimore Dry Docks & Shipbuilding Co., Baltimore, Md., will expend about \$3,000,000 on extensions to its plant. The buildings are expected to be ready for operation Dec. 1. Contracts have been let for most of the equipment. Holden A. Evans is president. The company has contracts for 10 vessels for the Government.

The Bethlehem Steel Company, Sparrows Point, Md., will erect an office building, 60 x 200 ft., at a cost of about \$200,000.

The factory to be erected on Calvert Street by the Baltimore Buggy Top Co., 107 West Mount Royal Avenue, Baltimore, Md., manufacturer of automobile tops, etc., will consist

of a four-story, reinforced-concrete building, about 75 x 120 ft. Clyde N. Friz, 1523 Munsey Building, Baltimore, is architect.

The Consolidated Gas, Electric Light & Power Co., Lexington Street Building, Baltimore, Md., is having plans prepared for a new concrete and brick power plant at Westport. George Beadenkopf, Westport, is the architect.

The Kelly-Springfield Tire Co., Akron, Ohio, is said to have completed plans for its new plant at Cumberland, Md., for the manufacture of automobile tires. The initial works will comprise four-story concrete buildings, with power station and other auxiliary structures. Plans have been filed for the construction of a new machine shop. The complete plant is estimated to cost about \$2,000,000. S. Diescher & Sons, Farmers' Bank Building, Pittsburgh, are consulting engineers.

The Frederick Iron & Steel Co., Frederick, Md., has been incorporated with a capital of \$150,000 to manufacture machinery and tools. W. A. Riddell, C. S. Hahn and George M. Gittinger are the incorporators.

The Ferguson Mfg. Co., Suffolk, Va., has been incorporated to operate a local plant for the manufacture of agricultural implements. Walter C. Ferguson is president.

E. L. Bloxom, Newport, News, Va., is contemplating the erection of a new plant for the construction of boats and allied repair work.

The Glamorgan Pipe & Foundry Co., Lynchburg, Va., will build an addition to its plant, about 40 x 80 ft., to cost about \$20,000. Contract for the erection has been awarded.

## Chicago

CHICAGO, June 25.

The Illinois Central Railroad has practically completed placing orders for the list of nearly 100 tools it had under inquiry. Only a few odd machines remain to be purchased. The deliveries will average about three months. Estimates are in for the list of about 104 tools for which the Chicago & Northwestern inquired about 10 days ago. Both railroads will save money by entering the market at the time they did, for general price advances have been announced for nearly all types of tools in the past few days. Radial drilling machines have been advanced 15 per cent, certain makes of large lathes 12½ per cent and some planers 10 per cent. Some makers of lathes and gear cutters have withdrawn prices altogether, and are taking orders with the understanding that prices will be determined at the time of delivery when they will be based on the cost of production, plus profit. In addition to this arrangement, buyers also are confronted with the stipulation that deliveries are contingent on the Government not having made previous claim on the machines.

Most of the dealers report that the demand for one or two tools from miscellaneous sources is keeping up good, although with the branch offices of some manufacturers the past week has been a quiet one. It cannot be learned that any munitions orders have been placed in this section. In one of two neighboring cities companies which successfully executed orders for shell-parts for foreign Governments are waiting for similar work for domestic delivery. As a rule they are waiting patiently, stating that they realize the big task which Washington has on its hands.

The Continental Can Co. has purchased 20 acres in the Clearing Industrial District of Chicago, with a frontage of 900 ft. on West Sixty-fifth Street and 980 ft. on South Fifty-fourth Avenue. It is stated that work will begin immediately on the first unit of a four-story concrete factory, containing approximately 1,000,000 sq. ft. The building will be laid out in the form of the letter E, and have a four-story wing, 120 ft. square projecting from the main building to be used exclusively for utilities and the conveniences of employees. Plans are being prepared by Davidson & Weiss, architects, Monadnock Block, Chicago. When completed the plant will employ 3000 persons.

Plans have been prepared for a one-story addition, 100 x 200 ft., to the factory of the Kurz-Downey Co., manufacturer of packing boxes, 1381 North Branch Street, Chicago, to cost about \$20,000.

The Chicago Short Line Railway Co., which serves the Iroquois Iron Co., the Mark Mfg. Co. and other industries in the Calumet district of Chicago, has purchased land upon which a round-house and coal pocket will be erected.

A six-story addition is to be made to the plant of the Kellogg Switchboard & Supply Co., West Adams Street, Chicago, at an estimated cost of \$220,000.

The Scoville Pump Valve Co., Chicago, has been incorporated with a capital stock of \$35,000 by John H. Scoville, Edward C. Brown and Amasa V. Scoville of Riverside, Ill.

The Krasberg Mfg. Co., manufacturer of tools, 412

Orleans Street, Chicago, has plans for the construction of a four-story plant to cost \$150,000.

The Niswander Mfg. Co., Quincy, Ill., has been incorporated with a capital stock of \$7,000 to manufacture demountable rims for automobiles. The incorporators are John L. Niswander, Harry L. Bert and Fred C. Scholz.

The Bettendorf Oxygen & Hydrogen Co., Davenport, Iowa, is building a 70-ft. addition to its plant which will double its present capacity.

## Milwaukee

MILWAUKEE, June 25.

The metalworking industry is still in a state of suspense over the uncertainties of Government requirements, but beyond this the main concern seems to be to get as much private work out of the way as can be manufactured and delivered while shops are still free. During the past week new bookings have been made at a rather brisk rate, although there is an absence of the feverish demand noted in the earlier months of the year. Among the large number of inquiries for prices and delivery dates are many which indicate that proposed shop extensions are dependent as much upon the ability of machine-tool makers to provide equipment as upon the ability of shop-owners to obtain building materials, labor and other necessities. The undercurrent of many inquiries, however, is one of indefiniteness, due to the uncertainties of the situation with regard to Federal action. The larger machine-tool makers in this district are still engaged in enlarging facilities by erecting extensions to shops and power plants, one manufacturer having announced plans for a 25 per cent enlargement of its shop within the last 10 days. The scarcity of skilled machine-shop labor is growing, but has not reached an acute stage.

The Racine Auto Tire Co., Racine, Wis., is having plans drawn for a tire and rubber factory, 260 x 320 ft., five stories and basement. The first floor will be 260 x 320 ft., and the additional stories will be built in 60-ft. units, with 30-ft. light wells. With complete equipment the cost is estimated at \$300,000. Construction will begin about Aug. 15. A steam generating plant also is being designed. L. J. Elliott is president. Frederick L. Sivyler, head of the Northwestern Malleable Iron Co., Milwaukee, is a director.

The Independent Foundry Co., West Allis, Wis., has been organized by former foremen and employees of gray iron foundries in the Milwaukee district, and purposes to build a new plant, 85 x 100 ft., on Burnham Street, near Forty-fifth Avenue, for the production of gray iron castings exclusively. The owners include Joseph Budzinski, Joseph and August Fons, Frank Sprader, S. Tomaszewski, W. Blady and A. W. Tabbert.

The Economy Power Appliance Co., Tomah, Wis., has perfected its organization by the election of the following officers: President, E. H. Manning; vice-president, W. A. Lee; secretary-treasurer, William B. Naylor. The company will manufacture wind-power machinery, devices and appliances of all kinds, but for the present will contract for their manufacture. Later a plant will be erected at Tomah.

The Silent Washer Mfg. Co., Clintonville, Wis., which recently decided to move its plant and headquarters from Appleton, Wis., to Clintonville, will award contracts July 1 for the erection of the first unit of its new factory, 50 x 120 ft., two stories and basement. Equipment is now being contracted for. Robert Fischer is secretary-treasurer.

The Racine Hack Saw Co., Racine, Wis., has been incorporated with a capital stock of \$10,000 to manufacture hand and power hack saws and similar devices. The incorporators are J. Mooers, William D. Thompson and Peter J. Myers.

The Racine Metal Cutting Machine Co., Racine, Wis., a corporation capitalized at \$5,000, has been organized by James E. and Harriet K. Pritchard and Louis A. Klinkert. It will engage in the production of mechanical devices for sawing and cutting metals.

The Winther Motor Truck Co., Kenosha, Wis., M. P. Winther, president, is having plans prepared for the first unit of its motor truck factory. The building will be 100 x 500 ft., one story, and cost \$100,000 with equipment.

The West Milwaukee locomotive and car shops of the Chicago, Milwaukee & St. Paul Railway have undertaken the construction of new box cars for the first time in more than 18 months. The car shops are being organized to provide for a daily output of 20 complete cars. The machine shops are fully occupied with repair work on locomotives. A call has been issued for 400 additional workmen for all departments.

The Hunt Boiler Works, Marinette, Wis., has been placed on an extra-time basis because of the increased demand for boilers, tanks and other plate work. Large contracts have been booked for equipment for Western sugar refineries, and boilers and steel stacks for sawmills in Wisconsin.

## Detroit

DETROIT, June 25.

Business in all lines is good. Brass, copper, aluminum and gray iron industries are working to capacity. Labor is well employed, and in most plants overtime is becoming the rule. Machine tool dealers are receiving a greatly increased number of inquiries and orders due to pronounced business activity.

The Linderman Steel & Machinery Co., Muskegon, Mich., will begin at once to enlarge its plant to take care of two Government contracts totaling \$5,000,000. The larger contract calls for the manufacture of 4-in. naval gun mounts to be completed by the end of 1918. The other is for 5-in. projectiles. B. A. Linderman is president.

The Duplex Truck Co., Lansing, Mich., has started work on its new factory, which will be equipped and ready for operation by Jan. 1. It will be two stories, of brick and steel, with 90,000 ft. of floor space and cost \$200,000. It plans to turn out ten trucks per day.

The Triangle Motor Truck Co., St. Johns, Mich., is planning to erect a factory, 60 x 150 ft., to turn out 900 1-ton trucks per year. Dr. Eugene Hart is president.

The Hayes Motor Truck & Wheel Co., St. Johns, Mich., is erecting five dry kilns, and has planned four more. Additional men are being employed.

The Service Auto Wheel Co., Grand Rapids, Mich., has been organized with \$10,000 capital to manufacture demountable wheels and other appliances. The stockholders are Russell A. Bates, Thomas Vander May, Harry E. Draa and Edward S. Kinnie.

The Progress Auto Equipment Co., Detroit, has been incorporated with a capital stock of \$50,000. Karl Torge, Herman A. Schmidt and Otto H. Schnepfer are the stockholders.

The Paragone Machine Co., Detroit, has been incorporated with a capital stock of \$15,000. James E. Hall, Charles M. Lutz and Thomas P. Troke are the stockholders.

The Liberty Shipbuilding Co., recently organized in Chicago with a capital of \$2,500,000, will take over the plant of the Montague Iron Works, Montague, Mich., and will soon begin the construction of a shipyard. Three large ways will be built, lofts and a saw mill will be added, and a railroad spur laid. The company plans to construct three large boats immediately.

The Sutherland Tool Co., formerly located in Flint, Mich., will move to Greenville, where a factory is being installed.

The Michigan Aircraft Co., Grand Rapids, Mich., has been organized for the construction of pleasure and military planes, and has located its factory at 1130 Wealthy Street, S. E. E. J. Clark is president.

The Chicago Stove & Range Co., Benton Harbor, Mich., will build a two-story machine shop and warehouse, 50 x 150 ft., to cost \$40,000. F. D. Chase, 122 South Michigan Avenue, Chicago, is the architect.

## Indianapolis

INDIANAPOLIS, IND., June 25.

The Hiatt Mfg. Co., Indianapolis, has been incorporated with \$20,000 capital stock to manufacture automobile parts. The directors are William F. Hiatt, E. L. Jordan, C. Willis Adams, Frank J. Oakes and Alfred Kauffman.

The Non-Spill Sanitary Dairy Pail Co., Indianapolis, has been incorporated with \$200,000 capital stock to manufacture dairy pails. The directors are Thomas S. Catlin, Hardy W. Robbins, Henry M. Robbins, Caleb Wilcox and Charles Hollowell.

The Geminden Mfg. Co., Indianapolis, has been incorporated with \$50,000 capital stock to manufacture water heaters and cookers. The directors are Frank Geminden, Frank Keil and Roy L. Kay, all of Jamestown, Mo.

The Muncie Casket Co., Muncie, Ind., has increased its capital stock from \$50,000 to \$80,000.

The Weigle Machine Tool Co., Peru, Ind., has been incorporated with \$115,000 capital stock, to manufacture heavy drill presses, lathes and automobile accessories. The directors are Albert P. Weigle, M. F. Gartland, G. E. Meck, Harry B. Fox and Thomas Ryder.

The L. T. Wilkins Mfg. Co., Indianapolis, has been incorporated with \$50,000 capital stock to manufacture sugar beet blockers and machinery. The directors are L. T. T. L. and H. F. Wilkins, all of Laurel, Mont.

The Long Light Lens Co., Kokomo, Ind., has been incorporated with \$25,000 capital stock to manufacture automobile headlights. The directors are Maurice E. Louth, Fred L. Trees and Earl B. Barnes.



## Cleveland

CLEVELAND, June 26.

A good demand is noted for small lots of machine tools, particularly for heavy lathes, planing and boring machines. Second-hand machinery is also in good call and scarce. Small lathes are now plentiful. There has been quite a general advance in prices the past week, a number of manufacturers having marked up lathes, radial drills, shapers and heavy forging machinery 10 to 15 per cent and planers 10 per cent. One line of boring mills has been advanced about 20 per cent. Considerable inquiry from the East is coming to local machinery houses. While dealers in some cases are able to supply the immediate demand for machines from stock, deliveries have become worse with many manufacturers. Some boring mills purchased a few days ago for the Akron rubber industry will not be delivered until September, 1918.

The Permanent Products Co., a Delaware corporation, with an authorized capital stock of \$1,000,000, has purchased a site in Brook Park, Cleveland, where it plans to erect a one and two-story plant, 50 x 275 ft., of brick, steel and concrete, for the manufacture of a patented lock nut. R. D. Stevenson is president and W. A. Thompson is secretary.

The Warner & Swasey Co., Cleveland, will enlarge its plant by the erection of a one-story machine shop that will cover a site about 200 ft. square.

The American Shipbuilding Co., Cleveland, has inquiries out for a turret lathe with an 18 and 20-in. swing, and two 26-in. lathes with 6 or 8-ft. centers.

The Ohio Stamping Machine Co., Cleveland, will build a factory addition at 1067 East 152nd Street to cost \$5,000.

The Rose Mfg. Co., Cleveland, has been incorporated with a capital stock of \$10,000 by J. C. Royon and others, to manufacture tools.

The Bunting Brass & Bronze Co., Toledo, Ohio, will erect an addition to its plant to cost \$14,000.

The Buckeye Milling Machine Co., New Philadelphia, Ohio, has been organized with a capital stock of \$70,000 to build milling machines. It will occupy the plant formerly used by the Wise-Herold Electric Co., near New Philadelphia, and will start operations shortly. The officers are T. B. Stroup, president; H. H. Herold, vice-president, and general manager; R. O. Finger, secretary, and E. R. Mowey, treasurer.

## Cincinnati

CINCINNATI, June 25.

No local Government contracts for war munitions have been directly placed, but several sub-contracts are under way in different shops. Additional orders for small screw machine parts are expected by a few firms from bidders who have the original contracts in hand, and to save time are farming out all the small work possible. A number of machine tools have been ordered by the Government direct, some of which are of special construction. Deliveries have been made on a part of the requirements.

Orders for machine tools from munition firms and ship-building companies have lately been more plentiful, but purchasers are not buying any large lists. It is also reported that England and France are quietly placing orders for machine tools for rush delivery. This particular business has been somewhat slow for the past two months or more. Another price advance on machine tools is scheduled some time soon, as castings are now costing more than at any time in the history of the business, with other materials in proportion. Several local makers have advanced their quotations about 10 per cent. Second-hand machinery is in better demand.

The Willard Machine Tool Co., Cincinnati, recently incorporated with \$100,000 capital stock, is now operating its plant in Covington, Ky., under new management. G. A. Willard, formerly president and founder of the firm, has disposed of his interest. G. Mattman is president and general manager and Thos. L. Bratten secretary and treasurer. Mr. Mattman was for a number of years a representative of the Cincinnati Milling Machine Co. in Europe. The company will continue making lathes.

The Scott-Spencer Co., Cincinnati, is moving equipment into its new plant on Madison Road. It will make a specialty of screw machine work.

The Fisher-Griffin Storage Battery Co., Cincinnati, will make an addition to its plant on Cheapside thoroughfare, between Eighth and Ninth streets.

The proposed core oven and pattern storage addition to the plant of the Modern Foundry Co., Oakley-Cincinnati,

will be 80 x 200 ft., of sawtooth roof construction. Work on the building will begin at an early date.

The Oakley Coal & Feed Co., Oakley-Cincinnati, will erect a coal storage plant, for which conveying equipment will be required.

The George Roller Bearing Co., Cincinnati, has been incorporated with \$10,000 capital stock by Edward Ritchie, R. E. Moore, J. Laughlin, W. H. Miller and A. L. Quill. It will take over the plant of the George Automatic Roller Bearing Co. at Winton Place.

The New Foundry Appliance Co., Hamilton, Ohio, has been incorporated with \$25,000 capital stock by Frank J. Becker, John A. Weigel, George F. Duemer and others. It will establish a plant in Trenton suburb for the manufacture of labor-saving devices for foundries, including a special lifting frame.

The Peerless Foundry Co., Hamilton, suffered a fire loss in its jannapping department June 21. No delay will be experienced in finishing work on hand.

The Dayton Metal Products Co., Dayton, Ohio, will erect a power building adjoining its plant, estimated to cost \$250,000. It is reported that the new building will be devoted to increasing the company's capacity. H. E. Talbott is president.

## The Central South

LOUISVILLE, June 25.

General business is good with the demand for motors and other power equipment far ahead of the supply. Coal mine development in eastern and western Kentucky is increasing with many inquiries and orders for equipment. Labor is scarce.

The Franks Tractor-Cultivator Co., Owensboro, Ky., has been incorporated with a capital stock of \$50,000 by W. L. Franks, W. O. Hoskins and W. W. Milan and will establish a factory to manufacture motor-driven cultivators.

The City Commission, Paducah, Ky., contemplates improving its municipal lighting plant with two 300-kw. generators and other additions to cost \$52,000.

Specifications for the waterworks improvements at Winchester, Ky., include pumping equipment for a working pressure of 250 lb. per square inch; a 200-hp. crude oil engine, etc. Bids will be received until July 6. S. B. Tracy, city clerk, Winchester, Ky., or R. M. Burns, 27 Fifth Street, Cincinnati, has specifications. The city has authorized a bond issue of \$180,000.

An electric power plant will be constructed by the Cape Fear Packing Co., Wilmington, N. C., at its new factories to be erected at Navassa, N. C. Refrigerating machinery will also be installed. Bids will be received to July 11. G. H. Smith is president. Wilson & Sompayrac, Columbia, S. C., are the architects.

The Metal Stamping Co., Wilmington, N. C., has been incorporated with a capital of \$200,000 to build a plant for the manufacture of stamped metal specialties. Plans for the works are being prepared. Frank P. Meier, Wilmington, one of the incorporators, is manager. Luther G. Gadd and Edward F. Hill, Baltimore, are also incorporators.

## Texas

AUSTIN, June 23.

There has been a noticeable improvement in the machinery and tool trade the past week. An unusual number of industrial projects which require the installation of considerable heavy machinery are on foot.

The new military cantonment to be situated adjacent to Fort Sam Houston, Texas, for the accommodation of the first contingent of about 40,000 conscripted men to be concentrated there this fall will be built by Stone & Webster, Boston. It is stated that the amount involved in the contract for 1000 buildings, including the construction of a complete sewer system, water works and electric light equipment for the new army camp is about \$4,000,000. This sum is exclusive of approximately \$3,000,000 that is to be expended by the Federal Government in the purchase of land and the erection of the necessary buildings for the accommodation of about 15,000 men who will be in constant attendance at the military aviation training school to be established here immediately.

The Fort Worth Elevator Co., Fort Worth, Tex., has increased its capital stock from \$250,000 to \$750,000, and will enlarge its plant. Additional machinery will be installed.

The Fulton Bag & Cotton Mills, Dallas, has awarded the contract for the erection of a five-story and basement concrete building, adjoining its present factory, to the Watson

Construction Co. The addition will be equipped with machinery for manufacturing cotton bagging and other goods.

The Texas Rolling Mill Co., Fort Worth, has increased its capital stock from \$240,000 to \$650,000. The additional proceeds will be used for enlarging its plant, including the installation of new machinery and equipment. The company has also amended its charter, changing its name to George W. Armstrong & Co., Inc.

The Rio Grande Ice Association, which owns ice and cold storage plants at Harlingen and San Benito, will construct a similar plant at Houston at a cost of \$150,000.

The Pan-American Trading Co. has awarded the contract for surveying the site and driving piles for its proposed shipbuilding yard at Houston. The company will also install a saw mill near Houston to manufacture lumber for its own uses. B. N. Garrett is president.

The Oklahoma Gas & Electric Co. has increased its capital stock from \$5,100,000 to \$50,000,000. It is announced that the proceeds are to be used to construct a large electric power plant in East Oklahoma and to build an extensive system of transmission lines. The company owns the light and power plants at Oklahoma City, Shawnee, Muskogee and several other towns of Oklahoma. H. M. Byllesby & Co., Chicago, are managers.

The Freeport Sulphur Co., which is owned by the Swenson syndicate of New York, is making a survey for a proposed interurban electric railroad to be constructed between Freeport and Houston, via Rosenberg, a distance of about 100 miles. It is stated that the contract for building the road will be awarded as soon as the survey is finished and the right of way is obtained. It is planned to utilize the surplus power of the steam plant at the sulphur mines near Freeport to generate electrical energy for operating the railroad.

The Arizona-Mexico Land Co., Yuma, Ariz., will install a 3000-hp. pumping plant near Yuma, to take water from the Colorado River to irrigate a tract of 17,000 acres.

The Rich Hill Mining Company, Wickenburg, Ariz., will install a compressor and power hoist at its mine.

## St. Louis

ST. LOUIS, June 25.

Very little change is noted in the machine tool market, as dealers in this section are not particularly affected by the call for shipbuilding equipment. Local industries are marking time regarding extensions and replacements, but all are practically working at capacity, or at least at such capacity as the labor supply will permit.

The Mitchell Automobile Corporation, St. Louis, has been incorporated with a capital stock of \$25,000 by William A. C. Halwe, Clyde Gary and Wesley A. Slinger and will equip a garage, machine and repair shop.

A. H. Burchard, Pontiac Building, St. Louis, is reported in the market for equipment for a malleable foundry, including a pattern shop.

The Kansas City Railways Co., Kansas City, Mo., will enlarge its repair shop to build its own cars.

The Bolin Metallic Door Co., Kansas City, Mo., A. H. Barber, president, has leased a two-story building, 75 x 120 ft., to manufacture sheet metal doors, window frames, etc.

The Morrilton Cotton Oil Co., Morrilton, Ark., has increased its capital from \$100,000 to \$120,000 and will add to its equipment.

The East St. Louis Cotton Oil Co., East St. Louis, Ill., will erect a 3-stand 80-saw ginnery at Piggott, Ark.

The Southwestern Utilities Co., Alva, Okla., has been incorporated with a capital stock of \$500,000 by Noel R. Gascho, W. A. Parrand and Albert Emanuel, Dayton, Ohio, to equip and operate electric plants.

The American Tank Co., Cushing, Okla., has been incorporated with a capital stock of \$60,000 by Howard Hannah and J. P. Walker, Cushing, and J. V. Shelts, Cleveland, Ohio, to manufacture metal tanks.

The Midland Motor Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$200,000 by Paul M. Pope, J. W. Sanders and O. E. Jones and will equip a garage and machine shop.

The Doherty-Walsh Roller Co., New Orleans, La., is in the market for wood-working equipment for the manufacture of wooden brake blocks with a special radius device for concave and convex surfaces.

The Kentwood Creamery, Kentwood, La., C. A. Kent owner, is in the market for equipment for a cold storage plant, ice making machinery, etc.

The Bogalusa Box & Veneer Co., Bogalusa, La., has been incorporated with a capital stock of \$100,000 by C. W. Ames, Crawfordsville, Ind., and others.

The Dixie Steel Corporation, New Orleans, has been incorporated in Delaware with a capital of \$500,000 to manufacture iron and steel products. Bennett W. Seidel, Gallier J. Capdeville and John G. Grosz, New Orleans, are the incorporators.

## The Pacific Coast

SAN FRANCISCO, June 19.

Machinery and machine tools for shipyards are still in urgent demand, both wood-working and steel-working machinery being sold up to capacity. Some San Francisco machinery houses state that sales could be increased at least 100 per cent were it possible to get deliveries from the East within reasonable time.

The Berger & Carter Co. has acquired the Pacific Tool & Supply Co., First and Mission streets, San Francisco. It will handle general machinery, iron and steel, and will act as Pacific coast agents for its Eastern connections instead of California agents as heretofore.

The Koppel Sales Co., Inc., San Francisco, has taken over the Pacific coast business of the Orenstein-Arthur Koppel Co., which retires from this section, and will occupy the same offices in the Rialto Building, San Francisco.

It is understood that the plans for the shops of the Pacific Electric Co., now under construction at Torrance, near Los Angeles, will be altered and extended to cover a plant for building new cars.

Joseph A. Moore, R. S. Moore and Andrew Moore have bought out the interests of Henry T. Scott, John T. Scott and Irving M. Scott, Jr., in the Moore & Scott Iron Works, shipbuilders, San Francisco. Andrew Moore becomes president, Joseph A. Moore vice-president and R. S. Moore continues as treasurer. The company now has under construction 10 ships, including four for the Cunard line, and has just secured contracts from the Government for the construction of 16 steel ships of 9400 tons capacity to cost approximately \$25,000,000. It is understood that the company will expend about \$500,000 for new ways, machine shops, boiler shops and other extensions.

The Southern Pacific Railroad Co., Sacramento, Cal., will erect a building 100 x 400 ft., to be known as Car Shop No. 3 and to cost \$45,000.

J. C. Higgins, San Diego, Cal., will install a brass foundry and brass working plant on Newton Avenue.

The General Motors Co., which recently bought out the Samson Sieve-Grip Tractor Co.'s plant at Stockton, Cal., has bought adjoining ground and will increase the plant to double capacity. The additional equipment will give it a capacity of 15 tractors per day.

The Amalgamated Oil Co. has completed plans for a machine and boiler shop, a new warehouse and an office building at Fullerton, Cal.

The Santa Fé Railroad Co. has awarded additional contracts to the amount of \$60,000 for the construction of a refrigerator car, repair and blacksmith shops, at San Bernardino, Cal.

The Universal Tool Co., Los Angeles, has been incorporated with a capital stock of \$25,000 by R. B. Ferguson, H. M. Douglas, W. A. Wright, D. R. and H. G. Gardner.

The Rare Metals Refining Co., Pasadena, Cal., has let a contract for the construction of a factory building at a cost of \$7,920.

The recently incorporated Terminal Shipbuilding Co., San Francisco, Cal., has opened offices at 417 Market Street.

The Acme Gas Engine Co., San Francisco, recently incorporated, is equipping a two-story building, 60 x 80 ft., at First and Minna streets. Small gas engines will be turned out within three months and later large engines of the Diesel type will be made. James S. Hawkins, formerly manager of the Standard Gas Engine Co., Oakland, is president.

The Scandia-Pacific Oil Engine Co., San Francisco, has concluded arrangements with the Netherlands Engineering Works of the Netherlands for manufacturing at San Francisco high power Diesel engines for vessels up to 15,000 tons.

The first unit of the new plant of the L. & B. Truck Mfg. Co., at Fifty-fourth Street and Boyle Avenue, Los Angeles, has been completed and the company plans for immediate occupancy. The new works will be used for the manufacture of motor truck attachments and auxiliary transmission equipment to increase the output. H. L. and W. P. Bidelman head the company.

The Western Pipe & Steel Co., 1758 North Broadway, Los Angeles, manufacturer of riveted steel, iron and steel pipe, tanks, etc., has removed its headquarters to San Francisco.

The City Council, Los Angeles, is planning for the con-

struction of a cold storage plant at Los Angeles Harbor, San Pedro, with capacity of about 50 tons, estimated to cost about \$20,000.

The Sespe Light & Power Co., Security Building, Los Angeles, is contemplating the construction of an electric power plant, with a capacity of 950 hp., on the Sespe River, Ventura County, to cost \$2,000,000.

J. Burris Mitchell and associates, Los Angeles, have leased about 50 acres at San Diego, Cal., for a shipbuilding plant. It is said that the proposed works will cost about \$500,000 for structures and machinery.

The Riverside Aircraft Co., Riverside, Cal., has been incorporated with a capital of \$250,000. It has secured property at Fifth and Vine streets and will establish a plant for the manufacture of aeroplanes and other aircraft. R. C. Bowman, E. T. Ford and B. J. Williams are the incorporators.

## The Pacific Northwest

SEATTLE, June 19.

Puget Sound shipbuilders hold contracts for 115 wooden and steel vessels, with a total value of \$120,000,000, of which \$80,000,000 is held by Seattle companies. Of these vessels 109 are merchant ships. Prices have advanced sharply on almost every grade of finished lumber.

It is predicted that the cannery business in Alaska and the Northwest will set new records this year, both in production and price. This is the year of the "big run," and preparations are being made for an output of 5,000,000 cases or 240,000,000 cans.

The Seattle Construction & Dry Dock Co., Seattle, has been awarded contract by the Government for 10 7500-ton steel ships, costing approximately \$14,000,000. Five vessels will be built in the Seattle yards and five at the plant of the Todd Shipbuilding Co., Tacoma, the two companies being subsidiaries of the Todd Shipyards Corporation, New York.

The Canadian Northern Railway Shops, Port Mann, B. C., will shortly begin operation and will build flat cars.

The shipbuilding plant under construction at St. Johns, Ore., by Grant-Smith & Co., Guthrie-McDougall Co., and Porter Brothers, when completed will run on three shifts of 8 hr. each and employ 2000 workmen. Construction of a sawmill is contemplated in conjunction with the shipyards.

The Anacortes Shipbuilding Co., Anacortes, Wash., which is constructing a yard on Guemes Island, plans the initial construction of six wooden ocean-going steamers.

The Hesse-Martin Iron Works, Portland, contemplates the construction of a foundry and machine shop, each 80 x 100 ft., blacksmith and structural shop, 40 x 60 ft., and other small buildings, to cost \$150,000. It will manufacture auxiliary machinery for ships, including deck winches, anchors, windlasses, steering engines and gears, steam capstans and propellers. It has contracts on hand amounting to more than \$150,000, and other orders awaiting completion of the new plant.

The Oregon Ship Timber Mills, Portland, has been organized to manufacture only long lengths and dimension material suitable for wooden ship construction. A plant will be erected immediately. The incorporators are E. D. Kingsley, L. B. Menefee, G. M. Standifer, G. B. Maxwell and C. E. Miller.

The Willamette Shipbuilding Co., Salem, Ore., has been incorporated for \$1,000,000 by F. B. Jones, W. E. Jones and Mark T. Kady. It will erect a wooden shipbuilding plant.

The E. M. Witherow Lumber Co., Centralia, Wash., which has a daily capacity of 15,000 ft. will install a planing and shingle mill.

The Cameron Lumber Co.'s mill, near Victoria, B. C., including the machine shop, was damaged to the extent of \$100,000 in a recent fire.

The Spokane Auto Mfg. Co., Spokane, Wash., plans to specialize in the manufacture of gasoline mine motors.

The Phillips Adding Machine Co., Spokane, Wash., incorporated with a capital stock of \$500,000, will immediately establish a factory.

The Warrenton Engineering & Construction Co., Warrenton, Ore., has been incorporated with branch offices in Portland, Seattle and other coast cities. It will construct two shipbuilding plants in Portland, each to have six ways.

Charles F. Swigert, head of the Pacific Bridge Co., Portland, Ore., announces that the Foundation Co., New York, which holds contracts for 50 vessels for the French Government, will erect a shipbuilding plant in Portland that will build 16 vessels at one time. It will be equipped with sawmill, machine shops and fitting out docks.

The Pacific Marine Iron Works, Portland, recently incorporated for \$125,000, has selected a site for its proposed plant in Portland. It holds contracts for marine boilers to the value of \$800,000.

The Skinner & Eddy Shipbuilding Corporation, Seattle, has purchased the property of the Centennial Mill Co. which adds five acres to the shipyards. Two new ways will be constructed.

Grant-Smith & Co., contractors and engineers, Seattle and Portland, have purchased the controlling interest in the Aberdeen Shipyards, owned by Andrew Peterson, for \$200,000. A frontage of 100 ft. adjoining the plant has been leased for extensions.

## Canada

TORONTO, June 25.

John Putherbough, 1006 Wellington Street, London, Ont., has been awarded contract for the erection of a foundry at London to cost \$45,000, for Beatty Brothers, Ltd., St. George Street, Fergus, Ont.

The Polson Iron Works, Ltd., Toronto, will build a boiler house at the foot of Sherbourne Street to cost \$60,000.

Pettypieces, Ltd., Amherstburg, Ont., is in the market for a second-hand steam shovel.

The International Harvester Co., Hamilton, Ont., will build a factory at Chatham, Ont., to manufacture farm implements, etc.

The business of H. L. Peiler & Co., steam specialties, and of the Canadian Griscom-Russell Co., have been acquired by the Mason Regulator & Engineering Co., 380 St. James Street, Montreal, recently organized. Eldon Macleod of the Mason Regulator Co., Boston, is president, and H. L. Peiler treasurer and general manager. E. J. Hatton has charge of the erecting and manufacturing and E. T. Jeffery and H. E. Kirkham will have charge of sales under the supervision of Mr. Peiler. The company proposes to manufacture in Canada Mason reducing valves and other pressure regulation devices, in addition to steam traps and blowers, and marine and steam specialties of the Canadian Griscom-Russell Co.

The Dominion Bridge Co., Montreal, and the Beardmore interests propose to establish a shipbuilding plant in Nova Scotia. The plan is now being considered by the Provincial Shipbuilding Commission.

E. Leonard & Sons, York Street, London, Ont., boiler and engine manufacturers, will build a brick and reinforced concrete addition to their plant at a cost of \$5,000.

The London & Petrolia Barrel Co., Simcoe Street East, London, will build an addition to its factory to cost \$8,500. Mr. Forristal is superintendent.

The Three Rivers Casting Co., Three Rivers, Quebec, is erecting a foundry on Hortel Street at a cost of \$35,000.

The Roy Co., Ltd., jewelry manufacturer, 23 River Street, Toronto, will build an additional story to its factory, now being erected at a cost of \$7,500.

The Russell Motor Car Co., 276 King Street, West, Toronto, will build a frame addition to its factory at a cost of \$7,500. Prack & Perrin, Lumsden Building, are the architects.

Contracts have been awarded for the erection of the new plant at Hamilton, Ont., for the National Abrasive Co., with main office in Boston, to cost \$100,000.

The Canada Iron Products Co., Ltd., Montreal, has been incorporated with a capital stock of \$1,000,000 by Ralph E. Allan, John P. Charbonneau, William Taylor and others to manufacture iron, steel, metals, machinery, tools, implements, etc.

The Allen Gold Mfg. Co., Ltd., Sherbrooke, Que., has been incorporated with a capital stock of \$40,000 by Louis A. David, Louis P. Crepeau, S. H. R. Bush and others to manufacture jewelry, silverware, watches, etc.

The United Brush Co. of Canada, Ltd., Hamilton, has been incorporated with a capital stock of \$50,000 by Morris Fletcher, Harry Nex, Alexander W. Brown and others to manufacture brushes, brooms, woodenware, etc.

The Holden-Morgan Thread Miller, Ltd., Toronto, has been incorporated with a capital stock of \$600,000 by William A. J. Case, 73 Bellefair Avenue; James B. Taylor, 78 Belhaven Road; William M. Smith, and others to manufacture machinery, iron, brass, steel, tools, electrical equipment, implements, etc.

The repair plant, machine shop and other buildings of the Canada Steamship Co., together with three small vessels in course of construction, were recently destroyed by fire with an estimated loss of \$150,000.



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